

LAKE MANITOU, GRAHAM DITCH WETLAND PROJECT



PROJECT MANUAL

LAKE MANITOU ASSOCIATION INC.
ROCHESTER, INDIANA

March 11, 1996

Property of
Lake and River Enhancement Section
Division of Fish and Wildlife/IDNR
402 W. Washington Street, W-273
Indianapolis, IN 46204

Gensic & Associates
civil engineering

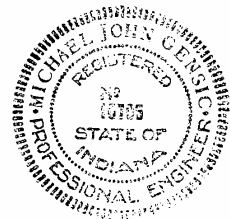
PROJECT MANUAL
for the
LAKE MANITOU, GRAHAM DITCH
WETLAND PROJECT
Rochester, Indiana

Lake Manitou Association Inc.
Rochester, Indiana

March 11, 1996

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DOCUMENT SET _____

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ADVERTISEMENT FOR BIDS

The Lake Manitou Association, Inc., Fulton County, Indiana, by and through its Board of Directors are requesting sealed bids for the Lake Manitou, Graham Ditch Wetland Project which will consist of the following improvements:

Construction of a Lake and River Enhancement Wetland Restoration Project.

Bids may be forwarded by mail addressed to The Lake Manitou Association, Inc. Board of Directors, P.O. Box 376, Rochester, Indiana, 46975; or delivered in person. Sealed bids may be submitted to the Lake Manitou Association, Inc., Board of Directors up to _____ local prevailing time on _____. Sealed bids may also be delivered in person to the Board of Directors _____, local prevailing time on _____ at the _____.

_____. Bids will be opened publicly and read aloud after _____, local prevailing time on _____ in the _____.

Any bids received after the bid submission time will be returned unopened.

No bid shall be withdrawn after the opening date without the consent of the Lake Manitou Association, Inc. Board of Directors for a period of ninety (90) days.

Each bid must be enclosed in a sealed envelope bearing the title of the project and the name and address of the Bidder.

Each bid shall be accompanied by a Certified Check or acceptable Bidder's Bond made payable to the Lake Manitou Association, Inc. in a sum of not less than five percent (5%) of the total amount of the highest aggregate proposal, which check or bond will be held by the Owner as evidence that the Bidder will, if awarded a contract or contracts, enter into the same with the Lake Manitou Association, Inc. upon notification from him to do so within fifteen (15) days of said notification.

Approved Performance and Payment Bonds guaranteeing faithful and proper performance of the work and materials, to be executed by an acceptable surety company, will be required of each contractor at the time he executes his contract. The bond will be in the amount of one hundred percent (100%) of the contract price and must be in full force and affect for a period of twelve (12) months from the date of written acceptance of the final payment for the work.

Failure to execute a contract and to furnish a Performance Bond as hereinafter set out will be cause for forfeiture to the Owner of the amount of money represented by the Certified Check or Bidder's Bond, as and for liquidated damages.

Bids shall be properly and completely executed on bid forms provided by the Engineer or Owner which include the Non-Collusion Affidavit. Proposals shall include the Form No. 96, Contractor's Bid for Public Works provided by and executed by the Bidder, all as required by statute.

Wage rates on the project shall not be less than the prescribed scale of wages as determined in accordance with Chapter 319 of the Acts of the Indiana General Assembly for the Year 1935, and all acts amendatory thereof and supplemental thereto, of Federal wage scale published by the U.S. Department of Labor as being in affect at the time of the Bid. The wage scale having the highest rate shall be the rate paid on this project.

The Lake Manitou Association, Inc. Board of Directors reserves the right to reject any bid, or all bids, or to accept any bid or bids, or to make such combination of bids as may seem desirable, and to waive any and all informalities in the bidding.

One (1) copy of each of the plans, specification and bidding documents may be obtained from the Lake Manitou Association, Inc. Board of Directors, _____, on receipt of a check made payable to Lake Manitou Association, Inc. in the amount of \$25.00. The \$25.00 deposit is not refundable. Plans, specifications, and bidding documents will be available _____.

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS.

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions of the Construction Contract (No. 1910-8, 1983 ed.) have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a Bid directly to Owner, as distinct from a sub-bidder, who submits a bid to a Bidder. The term "Successful Bidder" means the lowest, qualified, responsible, and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award. The term "Bidding Documents" includes the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids.)

2. COPIES OF BIDDING DOCUMENTS.

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Owner.

2.2 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS.

Each Bid shall include form 96-A, Standard Questionnaire, and Financial Statement for Bidders, provided and executed by the Bidder, as required by State Statute. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or convenient to obtain such qualification prior to award of contract.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE.

4.1 It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work, (c) consider federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work, (d) study and carefully correlate Bidder's observations with the

Contract Documents, and (e) notify Engineer of all conflicts, errors or discrepancies in the Contract Documents.

4.2 Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.

4.3 Before submitting a Bid, each Bidder will be responsible to make or obtain such explorations, tests, and data concerning physical conditions (surface, subsurface, and Underground Facilities) at or contiguous to the site, or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

4.4 On request in advance, Owner will provide each Bidder access to the site to conduct such exploration and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up, and restore the site to its former condition upon completion of such explorations.

4.5 The lands upon which the Work is to be performed, rights-of-way, and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easement for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract documents.

4.6 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing methods, techniques, sequences, or procedures of construction, as may be indicated in or required by the Contract Documents, and that Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5. INTERPRETATIONS AND ADDENDA.

5.1 All questions about the meaning or intent of the Contract Documents are to be directed to Engineer. Interpretations or clarifications considered necessary by Engineer in

response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer.

6. **BID SECURITY.**

6.1 Each Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety meeting the requirements of Paragraph 5.1 of the General Conditions.

6.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required contract security, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the forty-sixth day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

7. **CONTRACT TIME.**

The numbers of days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Time) are set forth in the Bid Form, the Agreement, and in latter sections of these Instructions to Bidders.

8. **LIQUIDATED DAMAGES.**

Provisions for liquidated damages, if any, are set forth in the Agreement and in the latter sections of these Instructions to Bidders.

9. **SUBSTITUTE OR "OR-EQUAL" ITEMS.**

The contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or

"or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in Paragraphs 6.7.1, 6.7.2, and 6.7.3 of the General Conditions and may be supplemented in the General Requirements.

10. SUBCONTRACTORS, SUPPLIERS, AND OTHERS.

10.1 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of the specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within seven days after the Bid opening submit to Owner a list of all such Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person, or organization if requested by Owner. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person, or organization, either may before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If apparent Successful Bidder declines to make any such substitution, Owner may award the contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the Bid security of any Bidder. Any Subcontractor, Supplier, other person or organization listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer, subject to revocation of such acceptance after the effective Date of the Agreement as provided in Paragraph 6.8.2 of the General Conditions.

10.2 In contracts where the Contract Price is on the basis of Cost-of-the-Work Plus a Fee, the apparent Successful Bidder, prior to the Notice of Award, shall identify in writing to Owner those portions of the Work that such Bidder proposes to subcontract and after the Notice of Award may only subcontract other portions of the Work with Owner's written consent.

10.3 No Contractor shall be required to employ any Subcontractor, Supplier, other person or organization against whom Contractor has reasonable objection.

11. BID FORM.

11.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from Engineer (or the issuing office).

11.2 All blanks on the Bid Form must be completed in ink or by typewriter.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

11.5 All names must be typed or printed below the signature.

11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

11.7 The address and telephone number for communications regarding the Bid must be shown.

12. SUBMISSION OF BIDS.

12.1 Bids shall be submitted at the time and place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of the Bidder and accompanied by the Bid security and other required documents. If the bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

12.2 It is the intent of the Owner to open Bids immediately after the designated time in the Advertisement for Bids. However, the Owner reserves the right to delay the Bid opening process in the event of unforeseen circumstances as determined by the Owner that may be a factor in delaying a Bidder from delivering a Bid on time. ~~No Bids will be received or opened after the Bid opening process has begun.~~

13. MODIFICATION AND WITHDRAWAL OF BIDS.

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

13.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

14. OPENING OF BIDS.

Bids will be opened and (unless obviously non-responsive) read aloud publicly. A copy of the certified bid tabulation sheet(s) will be furnished to each Bidder sometime after the tentative awards have been made.

15. AWARD OF CONTRACT.

15.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work, and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, not responsive, unbalanced, or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

15.2 In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid form or prior to the Notice of Award.

15.3 Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and

equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

15.4 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

15.5 If the contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.

16. CONTRACT SECURITY.

Paragraph 5.1 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and payment bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required performance and payment Bonds.

17. SIGNING OF AGREEMENT.

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen days thereafter Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Contractor.

18. LETTER FROM SURETY.

In addition to the Bid Bond, the Bidder shall submit a letter or statement from the Bidder's surety company that it will execute and deliver a one hundred percent surety bond.

19. SECURITY FOR FAITHFUL PERFORMANCE.

Simultaneously with the delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the Project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

20. POWER OF ATTORNEY.

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

21. LAWS AND REGULATIONS.

The Bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

22. SAFETY STANDARDS AND ACCIDENT PREVENTION.

With respect to all work performed under this Contract, the Contractor shall:

- a. Comply with the safety standards provisions of applicable laws, building and construction codes, and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register", Volume 36, No.75, Saturday, April 17, 1971.
- b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
- c. Maintain at his office or other well-known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor's care.

23. TAX EXEMPTIONS.

The Indiana Dept. of Revenue requires that the Contractor or Subcontractors engaged in a contract with a governmental agency must submit an exemption certificate for construction contractors (Form SP 134) to each supplier for each exempt Project. The Owner will cooperate with the Contractor in filing the necessary forms with the Indiana Dept. of Revenue, but the Contractor shall be responsible for the initiation of these proceedings. The contract price will be based upon a complete exemption from this tax, and if later determined

that a tax must be paid by the Owner, the contract price will be adjusted to reflect this liability to Owner.

24. ESCROW ACCOUNT(S).

The establishment of an escrow account between the Owner and the Successful Bidder(s) for the retainage will be left to the sole discretion of the Successful Bidder(s).

25. BIDS TO REMAIN OPEN.

All Bids shall remain open for ninety (90) days after the day of the bid opening. The Owner may release any Bid and return the Bid security prior to that date.

26. COMPLETION TIME AND LIQUIDATED DAMAGES.

Bidder agrees to commence work on or before the date to be specified in the written Notice to Proceed by Owner. Bidder further agrees that the Work will be substantially complete within one hundred, eighty (180) consecutive calendar days after the date when Contract Time commences to run and completed and ready for final payment within two hundred, forty (240) consecutive calendar days after the date when Contract Time commences to run. Bidder also agrees to pay as liquidated damages, the sum of one hundred dollars (\$100.00) for each consecutive calendar day thereafter.

27. EXCEPTIONS TO LIQUIDATED DAMAGES PROVISION.

It is further agreed that time is of the essence of each and every portion of this Agreement and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where, under the CONTRACT DOCUMENTS an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be the essence of this Agreement. Provided, that the CONTRACTOR shall not be charged with liquidated damages or any excess cost when the Owner determines that the CONTRACTOR is without fault and the CONTRACTOR'S reasons for the time extension are acceptable to the OWNER; provided further, that the CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1. To any preference, priority or allocation order duly issued by any governmental entity;

2. To unforeseeable cause beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another contractor in the performance of a contract with the OWNER.

28. FAMILIARITY WITH PROJECT SITE.

All bidders are required to examine the site prior to the preparation of their Bids.

29. LIABILITY INSURANCE.

The Successful Bidder shall provide proof of liability insurance in the amount of one million dollars (\$1,000,000.00) as set forth in Article 5.3 of the General Conditions.

30. LUMP SUM CONTRACT.

The Bidder shall accept lump sum payment for the completed project. Payment shall be according to Article 14 of the General Conditions.

31. REFERENCES.

As a part of the Bid Package each Bidder shall include references for previous similar projects. The references shall contain the following information:

1. Name of person or agency contracted with
2. Address of person or agency
3. Contact person
4. Phone number
5. Brief description of Project

32. ALTERNATE BIDS.

Bidders must bid on all alternate bids.

33. SUMMARY OF ITEMS TO BE SUBMITTED WITH BID.

1. Bid Form - Completely executed and signed (including Alternate Bid)
2. Bid Security - Acceptable bid bond or cashier's check in an amount not less than 5% of the total bid price
3. From 96, Contractors Bid for Public Works including fully executed Non-Collusion Affidavit
4. Proof of Insurance
5. References

BID
LAKE MANITOU. GRAHAM DITCH
WETLAND PROJECT
LAKE MANITOU ASSOCIATION INC.

TO: Board of Directors
Lake Manitou Association Inc.
P.O. Box 376
Rochester, Indiana 46975

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid Security. This Bid will remain open for ninety (90) days after the day of Bid opening. BIDDER will sign the Agreement and submit the Contract Security and other Documents required by the Contract Documents within fifteen (15) days after of OWNER's Notice of Award.
3. In submitting his Bid, BIDDER represents, as more fully set forth in the Agreement, that:
 - a. BIDDER has examined copies of all the Contract Documents, Advertisement or Invitation to Bid and the Instructions to Bidders, and BIDDER has examined copies of (receipt of all of which are hereby acknowledged) Addenda Nos. _____.
 - b. BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of Work.
 - c. BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in Paragraph 4.2 of the General Conditions, and accepts the determination set forth in Paragraph SC-4.2 of the supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which BIDDER is entitled to rely.
 - d. BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, and studies, (in addition to or to supplement those referred to in c above) which pertain to

the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance, or furnishing of the Work as BIDDER considers necessary for the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by BIDDER for such purpose.

- e. BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, or similar information of data in respect of said Underground Facilities are or will be required by BIDDER in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.3 of the General Conditions.
 - f. BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.
 - g. BIDDER has given ENGINEER written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.
 - h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
4. BIDDER will complete the work for the following prices: (Where lump sum figures are used, the Contractor shall furnish to the Engineer upon request a detailed breakdown of said lump sum cost. Where unit and unit price figures are used as part of the Bid, they will be used in computing the Contractor's payments. Quantities are not guaranteed. Final payment will be based upon the actual quantities placed in the Work.
5. BIDDER may attach separate proposal forms in addition to this bid form.

BASE BID

LAKE MANITOU, GRAHAM DITCH WETLAND PROJECT
Structure #2, Baffles #1 thru #4, and Sediment Basins #1 and #2. \$ _____ .

BASE BID MANDATORY ALTERNATE NO. 1
Weir Draw-Down Structure \$ _____ .

BASE BID MANDATORY ALTERNATE NO. 2
Pipe Draw-Down Structure \$ _____ .

ALTERNATE BID

LAKE MANITOU, GRAHAM DITCH WETLAND PROJECT
Structure #1 and Baffles #5 and \$6 \$ _____ .

ALTERNATE BID, MANDATORY ALTERNATE NO. 1
Weir Draw-Down Structure \$ _____ .

ALTERNATE BID, MANDATORY ALTERNATE NO. 2
Pipe Draw-Down Structure \$ _____ .

6. The following documents are attached to and made a condition of this Bid:
- a. Bid Form - Completely executed and signed (including Alternate Bid)
 - b. Bid security - Acceptable bid bond or cashier's check in an amount not less than 5% of the total bid price
 - c. Form 96, Contractors Bid for Public Works including fully executed Non-Collusion Affidavit
 - d. Proof of Insurance
 - e. Reference

7. The terms used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

8. Submitted on _____, 19____.

By: Contractor

(Corporation ___) (Partnership ___) (Individual ___)

(SEAL)

By _____

(Name & Title of Person
Authorized to Sign)

Business Address _____

BID FORM

This Bid Form shall be submitted with the Proposal

Lake Manitou, Graham Ditch

Wetland Project

BASE BID

Contractor _____

Address _____

Telephone _____

| ITEM NO. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | | AMOUNT | |
|----------|---|----------|------|------------|------|---------|------|
| | | | | DOLLARS | CNTS | DOLLARS | CNTS |
| 1 | Structure #2 | | | | | | |
| 2 | Baffle #1 | | | | | | |
| 3 | Baffle #2 | | | | | | |
| 4 | Baffle #3 | | | | | | |
| 5 | Baffle #4 | | | | | | |
| 6 | Sediment Basin # 1 | | | | | | |
| 7 | Sediment Basin # 2 | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | BASE BID AMOUNT | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 1-A | Base Bid, Mandatory Alternate No. 1 Weir Draw-Down Structure | 1 | EA | | | | |
| | | | | | | | |
| | | | | | | | |
| 1-B | Base Bid, Mandatory Alternate No. 2 Pipe Draw-Down Structure | 1 | EA | | | | |
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BID FORM

This Bid Form shall be submitted with the Proposal

Lake Manitou, Graham Ditch
Wetland Project
ALTERNATE BID

Contractor _____
Address _____
Telephone _____

| UNIT NO. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | | AMOUNT | |
|----------|---|----------|------|------------|------|---------|---|
| | | | | DOLLARS | CNTS | DOLLARS | C |
| 8 | Structure #1 | 1 | EA | | | | |
| 9 | Baffle #5 | 1 | EA | | | | |
| 10 | Baffle #6 | 1 | EA | | | | |
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| | | | | | | | |
| | ALTERNATE BID AMOUNT | | | | | | |
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| 8-A | Alternate Bid, Mandatory Alternate No. 1 Weir Draw-Down Structure | 1 | EA | | | | |
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| | | | | | | | |
| 8-B | Alternate Bid, Mandatory Alternate No. 2 Pipe Draw-Down Structure | 1 | EA | | | | |
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TABLE OF BID ITEMS AND ASSOCIATED SPECIFICATIONS

| BASE BID ITEMS | | |
|---------------------|-------------------|---|
| ITEM NO. | ITEM | ASSOCIATED SPECIFICATIONS All material and workmanship required to construct a complete and finished ITEM including but not limited to the following: |
| 1 1-A 1-B | Structure #2 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 10. Geotextile Fabric Construction; 11. Gabions; 12. Riprap; 13. Sheet Piling; 14. Landscaping; 15. Seeding and Sodding. (Alternate No. 1., 16. Penetreated Lumber) (Alternate No. 2., 05. Catch Basins, Inlet, Manholes, and Special Structures; 06. Corrugated Metal Pipe; 09. Cast in Place Concrete.) |
| 2 | Baffle #1 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |
| 3 | Baffle #2 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |
| 4 | Baffle #3 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |
| 5 | Baffle #4 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |
| 6 | Sediment Basin #1 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |
| 7 | Sediment Basin #2 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |

| ALTERNATE BID ITEMS | | |
|----------------------|--------------|---|
| ITEM NO. | ITEM | ASSOCIATED SPECIFICATIONS All material and workmanship required to construct a complete and finished ITEM including but not limited to the following: |
| 8 8- A 8-B | Structure #1 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 10. Geotextile Fabric Construction; 11. Gabions; 12. Riprap; 13. Sheet Piling; 14. Landscaping; 15. Seeding and Sodding. (Alternate No. 1., 16. Penetreated Lumber) (Alternate No. 2., 05. Catch Basins, Inlet, Manholes, and Special Structures; 06. Corrugated Metal Pipe; 09. Cast in Place Concrete.) |
| 9 | Baffle #5 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |
| 10 | Baffle #6 | 01. Construction Engineering; 02. Clearing and Grubbing; 03. Excavating, Backfilling, and Compacting; 04. Finishing Shoulders, Ditches, and Slopes; 14. Landscaping; 15. Seeding and Sodding. |

NOTICE OF AWARD

Date: _____, 19____

To Contractor:

PROJECT: (Insert name of Contract as it appears in the Bid Documents)

You are hereby notified that your Bid dated _____, 19____, for the above Contract has been evaluated and you are the apparent successful bidder. You have been awarded a contract for (insert description of work including which, if any, alternate bids)

The Contract Price of your contract is \$ _____.

Three copies of the proposed Agreement (Contract) accompany this Notice of Award, that is by

_____, 19____.

1. You must deliver to the Owner three fully executed counterparts of the agreement (Contract). Each of the Agreements must bear your signature.
2. You must deliver the Contract Securities (Performance & Payment Bonds) as specified in the Instructions to Bidders, General Conditions and Supplementary Conditions.

3. You must deliver the Certificates of Insurance as specified in the General Conditions and Supplementary Conditions (Paragraph S.C. 5.3).
4. (List other conditions, if applicable):

Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten days after you comply with these conditions, OWNER will return to you one fully signed counterpart of the Agreement for your records.

OWNER:

(Name & Title)

(City, Town, or County)

cc: Gensic & Associates
311 Airport North Office Park
Fort Wayne, IN 46825

AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT is by and between the **LAKE MANITOU ASSOCIATION, INC.** (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR). **OWNER** and **CONTRACTOR**, in consideration of the mutual covenants hereinafter set forth, agrees as follows:

ARTICLE 1. WORK

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Project is generally described as follows:

Construction of the Lake Manitou, Graham Ditch Wetland Project consisting of the base bid and alternate item _____.

ARTICLE 2. ENGINEER

The Project has been designed by Gensic & Associates, Fort Wayne, Indiana, who is hereinafter called ENGINEER and who is to act as OWNER'S representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3. CONTRACT TIME

3.1 The work will be substantially completed within 180 consecutive calendar days from the date when the Contract Time commences to run as provided in Paragraph 2.3 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.13 of the General Conditions within 240 consecutive calendar days from the date when the Contract Time commences to run Contract Time shall commence on or about _____, 199__.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Contractor agrees to pay as liquidated damages a sum of one hundred dollars (\$100.00) per day for each consecutive calendar day thereafter.

ARTICLE 4. CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents, in current funds, as follows: \$_____. This Contract Price includes Lake Manitou Graham Ditch Wetland Project base bid and the alternate bid.

ARTICLE 5. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Application for Payment will be processed by ENGINEER as provided in General Conditions.

5.1 **Progress Payments.** OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S applications for Payment as recommended by ENGINEER, on or about the 5th day of each month during the progress of Work measured by the schedule of values established in Paragraph 2.9 of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

5.1.1 Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with Paragraph 14.7 of the General Conditions.

Ninety-five (95%) of Work completed.

Ninety-five percent (95%) of material and equipment not incorporated in the work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided paragraph 14.2 of the General Conditions.

5.1.2 Upon Substantial Completion, in an amount sufficient to increase total payments to CONTRACTOR to 98% of the Contract Price, less such amounts as Engineer shall determine, or OWNER may withhold, in accordance with paragraph 14.7 of the General Conditions.

5.2 **Final Payment.** Upon final completion and acceptance of the Work in accordance with Paragraph 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said Paragraph 14.13.

ARTICLE 6. INTEREST

All moneys not paid when due as provided in Article 14 of the General Conditions may bear interest at the maximum rate allowed by law at the place of the Project.

ARTICLE 7. CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

7.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract

Documents, Work, site, locality, and all local conditions, and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

7.2 CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in Paragraph 4.2 of the General Conditions, and accepts the determination set forth in Paragraph SC-4.2 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which CONTRACTOR is entitled to rely.

7.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, exploration, test, reports, and studies (in addition to or to supplement those referred to in Paragraph 7.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.2 of the General Conditions; and no additional examinations, investigations, exploration, tests, reports, studies, or similar information or data are or will be required by CONTRACTOR for such purposes.

7.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibilities for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies, or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.3 of the General Conditions.

7.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, exploration, tests, reports, and studies with the terms and conditions of the Contract Documents.

7.6 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract Document and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

ARTICLE 8. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work consist of the following:

- 8.1 This Agreement (pages 1 to 5, inclusive).
- 8.2 Performance and Payment bonds per the Project Manual.

- 8.3 Certificates of Insurance per the Project Manual.
- 8.4 Notice of Award.
- 8.5 The Project Manual including the General Conditions, Supplementary Conditions, any and all special requirements and /or provisions, specifications, construction standards, and all other sections of the Project Manual except the Bid Documents.
- 8.6 Drawings (Plans), consisting of sheets numbered 1 through 5, inclusive.
- 8.7 Addenda Number(s) _____ .
- 8.8 CONTRACTOR'S BID (pages B/1 to B/3, inclusive).
- 8.9 Other documentation submitted by CONTRACTOR prior to Notice of Award (insert name and date or other documentation, if applicable: if none, insert N/A. _____ .
- 8.10 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying or supplementing the Contract Document pursuant to Paragraphs 3.4 and 3.5 of the General Conditions.

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraphs 3.4 and 3.5 of the General Conditions. The documents listed in Paragraph 8.2 eg. seq. above are not attached to this Agreement but are to be maintained as matter of record and reference at the office of the ENGINEER, CONTRACTOR, and OWNER.

ARTICLE 9. MISCELLANEOUS

- 9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 9.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR, and ENGINEER. All portions of the Contract Document have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 19__ (Date to be inserted by OWNER, not CONTRACTOR.)

CONTRACTOR

OWNER

LAKE MANITOU ASSOCIATION, INC.

(Company Name)

By _____
(Name and Title)

Address for Giving Notices

Agent and Address for Service of Process:

By _____

Attest:

NOTICE TO PROCEED

Date: _____, 19__

To Contractor:

PROJECT: (Insert name of Contract as it appears in the Bid Documents)

You are hereby notified to proceed with the above referenced project and that Contract Time for the above contract will commence to run on _____, 19____. No later than that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement (Contract), the dates of Substantial Completion and Final Completion are _____, 19____, and _____, 19____, respectively.

Before you may start any Work at the site, Paragraph 2.7 of the General Conditions provides that you deliver to us Certificates of Insurance (with a copy sent to the Engineer) per the Contract Documents.

OWNER:

(Name and Title)

(City, Town, or County)

cc: Gensic & Associates
311 Airport North Office Park
Fort Wayne, IN 46825

CHANGE ORDER

Order No. _____

Date: _____

Agreement Date: _____

NAME OF PROJECT: _____

OWNER: _____

CONTRACTOR: _____

The following changes are hereby made to the CONTRACT DOCUMENTS:

Justification:

Change to CONTRACT PRICE:

Original CONTRACT PRICE \$ _____

Current CONTRACT PRICE adjusted by previous CHANGE ORDER \$ _____

The CONTRACT PRICE due to this CHANGE ORDER will be (increased) (decreased)
by: \$ _____

The new CONTRACT PRICE including this CHANGE ORDER will be \$ _____

Change to CONTRACT TIME:

The CONTRACT TIME will be (increased) (decreased) by _____ calendar days.

The date for completion of all work will be _____ (Date).

Approvals Required:

To be effective this Order must be approved by the Federal agency if it changes the scope or objective of the PROJECT, or as may otherwise be required by the SUPPLEMENTAL GENERAL CONDITIONS.

Requested by: _____

Recommended by: _____

Ordered by: _____

Accepted by: _____

Federal Agency Approval (where applicable) _____

COMPLETION AFFIDAVIT

IN THE MATTER relating to the Improvement Project and Contract for _____
_____ and the plans and specifications relating
thereto comes now _____, who being duly sworn upon oath and says
he is _____, of _____,
(title) (corporation name)
the corporation to whom was awarded the contract, and who performed the work required under
_____ Improvement Project.

The undersigned is familiar with and personally knows the requirements of the plans and
specifications of the improvement project and contract, and further knows that _____
(corporation name) has complied with the terms and conditions of the
contract in every particular, and that the material used was of the character, kind, quantity, and quality
required therein, and that any and all subcontractors, material suppliers, and workmen have received
their just compensation, all this according to and under the direction of the _____

(Owner)

STATE OF INDIANA:

COUNTY OF _____ SS:

SUBSCRIBED and sworn to before me, this _____ day of _____, 1995.

Notary Public

(Printed/typed name of Notary)

My Commission Expires:

Resident of _____ County, Indiana

SPECIAL PROVISIONS

SPECIAL PROVISIONS

1. Contractor shall comply with all applicable provisions set forth in the Department of the Army Permit, IDNR Certificate of Approval of Construction in a Floodway, and the Indiana Department of Environmental Management Letter. Copies of these documents appear in Appendix A of this project manual.

General Conditions

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by
Engineers Joint Contract Documents Committee
and

Issued and Published Jointly By



PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

CONSTRUCTION SPECIFICATIONS INSTITUTE

This document has been approved and endorsed by

The Associated General  Contractors of America

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-8-A-1 or 1910-8-A-2, 1983 editions). Their provisions are interrelated and a change in one may necessitate a change in the others. Comments concerning their usage are contained in the Commentary on Agreements for Engineering Services and Contract Documents, No. 1910-9, 1981 edition. For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17, 1983 edition). When bidding is involved, the Standard Form of Instructions to Bidders (No. 1910-12, 1983 edition) may be used.

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1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council
1015 15th Street, N.W., Washington, D.C. 20005

American Society of Civil Engineers
345 East 47th Street, New York, NY 10017

Construction Specifications Institute
601 Madison St., Alexandria, VA 22314

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GENERAL CONDITIONS

ARTICLE I—DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Addenda—Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

Agreement—The written agreement between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment—The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid—The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bonds—Bid, performance and payment bonds and other instruments of security.

Change Order—A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents—The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

Contract Price—The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

Contract Time—The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

CONTRACTOR—The person, firm or corporation with whom OWNER has entered into the Agreement.

defective—An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.8 or 14.10).

Drawings—The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

Effective Date of the Agreement—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

ENGINEER—The person, firm or corporation named as such in the Agreement.

Field Order—A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Time.

General Requirements—Sections of Division I of the Specifications.

Laws and Regulations; Laws or Regulations—Laws, rules, regulations, ordinances, codes and/or orders.

Notice of Award—The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

Notice to Proceed—A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR'S obligations under the Contract Documents.

OWNER—The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

Partial Utilization—Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

Project—The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Resident Project Representative—The authorized representative of ENGINEER who is assigned to the site or any part thereof.

Shop Drawings—All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.

Specifications—Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor—An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion—The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

Supplementary Conditions—The part of the Contract Documents which amends or supplements these General Conditions.

Supplier—A manufacturer, fabricator, supplier, distributor, materialman or vendor.

Underground Facilities—All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work—Work to be paid for on the basis of unit prices.

Work—The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

Work Directive Change—A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER,

ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

Written Amendment—A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly Work-related aspects of the Contract Documents.

ARTICLE 2—PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2. OWNER shall furnish to CONTRACTOR up to ten copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Time; Notice to Proceed:

2.3. The Contract Time will commence to run on the thirtieth day after the Effective Date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the seventy-fifth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

Starting the Project:

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown

thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2. a preliminary schedule of Shop Drawing submissions; and

2.6.3. a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission.

2.7. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4, and OWNER shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7.

Preconstruction Conference:

2.8. Within twenty days after the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Finalizing Schedules:

2.9. At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with para-

graph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefor. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials or equipment such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification

from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

Amending and Supplementing Contract Documents:

3.4. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

- 3.4.1. a formal Written Amendment,
- 3.4.2. a Change Order (pursuant to paragraph 10.4), or
- 3.4.3. a Work Directive Change (pursuant to paragraph 10.11).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

- 3.5.1. a Field Order (pursuant to paragraph 9.5),
- 3.5.2. ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or
- 3.5.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.6. Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4—AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and

such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in OWNER's furnishing these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Physical Conditions:

4.2.1. *Explorations and Reports:* Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon nontechnical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

4.2.2. *Existing Structures:* Reference is made to the Supplementary Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3. *Report of Differing Conditions:* If CONTRACTOR believes that:

4.2.3.1. any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2. any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify OWNER and ENGINEER in writing about the inaccuracy or difference.

4.2.4. *ENGINEER's Review:* ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5. *Possible Document Change:* If ENGINEER concludes that there is a material error in the Contract Documents or that because of newly discovered conditions a change in the Contract Documents is required, a Work Directive Change or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6. *Possible Price and Time Adjustments:* In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference. If OWNER and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

Physical Conditions—Underground Facilities:

4.3.1. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and,

4.3.1.2. CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2. *Not Shown or Indicated.* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to

determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price, or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Reference Points:

4.4. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the General Requirements), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE 5—BONDS AND INSURANCE

Performance and Other Bonds:

5.1. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of

the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to OWNER.

Contractor's Liability Insurance:

5.3. CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

5.3.1. Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts;

5.3.2. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

5.3.3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.4. Claims for damages insured by personal injury liability coverage which are sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (b) by any other person for any other reason;

5.3.5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

5.3.6. Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The insurance required by this paragraph 5.3 shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least

thirty days' prior written notice has been given to OWNER and ENGINEER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing defective Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish OWNER with evidence of continuation of such insurance at final payment and one year thereafter.

Contractual Liability Insurance:

5.4. The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

Owner's Liability Insurance:

5.5. OWNER shall be responsible for purchasing and maintaining OWNER's own liability insurance and, at OWNER's option, may purchase and maintain such insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance:

5.6. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insureds or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.7. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER AND ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.8. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to CONTRACTOR by certified mail and will contain waiver provisions in accordance with paragraph 5.11.2.

5.9. OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount, will be borne by CONTRACTOR. Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policy, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

Waiver of Rights:

5.11.1. OWNER and CONTRACTOR waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraphs 5.6 and 5.7 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, ENGINEER, ENGINEER's consultants and all other parties named as insureds in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of OWNER, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

5.11.2. OWNER and CONTRACTOR intend that any policies provided in response to paragraphs 5.6 and 5.7 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any of the parties named as insureds or additional insureds, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant OWNER will obtain the same, and if

such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Receipt and Application of Proceeds:

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. OWNER as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, OWNER as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of such duties.

Acceptance of Insurance:

5.14. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3 and 5.4 on the basis of its not complying with the Contract Documents, OWNER shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. If CONTRACTOR has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 on the basis of their not complying with the Contract Documents, CONTRACTOR shall notify OWNER in writing thereof within ten days of the date of delivery of such certificates to CONTRACTOR in accordance with paragraph 2.7. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided by each as the other may reasonably request. Failure by OWNER or CONTRACTOR to give any such notice of objection within the time provided shall constitute acceptance of such insurance, purchased by the other as complying with the Contract Documents.

Partial Utilization—Property Insurance:

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no

such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

ARTICLE 6—CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

6.2. CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.7.1. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by ENGINEER if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or

royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

6.7.2. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.3. ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by

OWNER and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

6.9. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.10. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11. All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph 5.11. CONTRACTOR shall pay each Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraphs 5.6 and 5.7.

Patent Fees and Royalties:

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER

or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorneys' fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits:

6.13. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.15. CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the

place of the Project which are applicable during the performance of the Work.

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER or ENGINEER by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER and ENGINEER harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work.

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon com-

pletion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all employees on the Work and other persons and organizations who may be affected thereby;

6.20.2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21. CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.22. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

6.23. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

6.24. CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.25.1. Before submission of each Shop Drawing or sample CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.25.2. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on

each Shop Drawing submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.27. ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

6.28. Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

Indemnification:

6.30. To the fullest extent permitted by Laws and Regulations CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work,

provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31. In any and all claims against OWNER or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.32. The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7—OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and, if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

7.2. CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CON-

TRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3. If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure so to report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions. Unless otherwise provided in the Supplementary Conditions, neither OWNER nor ENGINEER shall have any authority or responsibility in respect of such coordination.

ARTICLE 8—OWNER'S RESPONSIBILITIES

8.1. OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to arbitration.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing struc-

tures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5. OWNER's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.8.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9—ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

Project Representation:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions. If OWNER designates another agent to represent OWNER at the site who is not ENGINEER's agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.28 inclusive.

9.8. In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11 and 12.

9.9. In connection with ENGINEER's responsibilities in respect of Applications for Payment, etc., see Article 14.

Determinations for Unit Prices:

9.10. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decisions thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other party to the Agreement and

to ENGINEER written notice of intention to appeal from such a decision.

Decisions on Disputes:

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13. Neither ENGINEER's authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14. Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be

effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

9.15. ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10—CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefor as provided in Article 11 or Article 12.

10.3. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.22 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.4.1. changes in the Work which are ordered by OWNER pursuant to paragraph 10.1, are required because of acceptance of defective Work under paragraph 13.13 or correcting defective Work under paragraph 13.14, or are agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11—CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3. The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1. through 11.9.3, inclusive).

11.3.2. By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3. On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

Cost of the Work:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject

to the other provisions of the Contract Documents insofar as applicable.

11.4.4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof—all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage

requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER in accordance with paragraph 5.9.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4— all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR'S capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

11.5.6. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee:

11.6. The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee; or if none can be agreed upon,

11.6.2. a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1. for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen percent;

11.6.2.2. for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five percent; and if a subcontract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen percent;

11.6.2.3. no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.4. the amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's Fee by an amount equal to ten percent of the net decrease; and

11.6.2.5. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.4, inclusive.

11.7. Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

11.8.1. The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2. CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the

allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

Unit Price Work:

11.9.1. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

11.9.2. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.9.3. Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.

ARTICLE 12—CHANGE OF CONTRACT TIME

12.1. The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time

shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3. All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) for delay by either party.

ARTICLE 13—WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1. CONTRACTOR warrants and guarantees to OWNER and ENGINEER that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to CONTRACTOR. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2. ENGINEER and ENGINEER's representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

Tests and Inspections:

13.3. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also

be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by OWNER (unless otherwise specified).

13.5. All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR (or by ENGINEER if so specified).

13.6. If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.7. Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

Uncovering Work:

13.8. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent

thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Owner May Stop the Work:

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

Correction or Removal of Defective Work:

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with *nondefective* Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

One Year Correction Period:

13.12. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be *defective*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions, either correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with *nondefective* Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential

costs attributable to OWNER's evaluation of and determination to accept such *defective Work* (such costs to be approved by ENGINEER as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct *defective Work* or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective Work*. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14—PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1. The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

14.2. At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3. CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4. ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a

representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or OWNER to withhold payment to CONTRACTOR.

14.6. ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER to OWNER that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been damaged requiring correction or replacement,

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling

OWNER to a set-off against the amount recommended, but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action.

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by OWNER of any finished part of the Work, which has specifically been identified in the Contract Docu-

ments, or which OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and useable part of the Work that can be used by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.10.2. OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Final Inspection:

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents—all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

Final Payment and Acceptance:

14.13. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation—all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.16.

Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

14.14. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Contractor's Continuing Obligation:

14.15. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of defective Work by OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims:

14.16. The making and acceptance of final payment will constitute:

14.16.1. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights in respect of

CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2. a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15—SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1. OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

Owner May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2. if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3. if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4. if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

15.2.5. if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6. if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents

(including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as revised from time to time);

15.2.7. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if there be one) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs).

Contractor May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

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ARTICLE 16—ARBITRATION

16.1. All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of, or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.16) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this Article 16. This agreement so to arbitrate and any other agreement or consent to arbitrate entered into in accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

16.2. No demand for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 9.11 will be made until the earlier of (a) the date on which ENGINEER has rendered a decision or (b) the tenth day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which ENGINEER has rendered a written decision in respect thereof in accordance with paragraph 9.11; and the failure to demand arbitration within said thirty days' period shall result in ENGINEER's decision being final and binding upon OWNER and CONTRACTOR. If ENGINEER renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of ENGINEER rendered in accordance with paragraph 9.10 will be made later than ten days after the party making such demand has delivered written notice of intention to appeal as provided in paragraph 9.10.

16.3. Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the

American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

16.4. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's agents, employees or consultants) who is not a party to this contract unless:

16.4.1. the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration,

16.4.2. such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

16.4.3. the written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

16.5. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and will not be subject to modification or appeal except to the extent permitted by Sections 10 and 11 of the Federal Arbitration Act (9 U.S.C. §§10,11).

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ARTICLE 17—MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time:

17.2.1. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

General:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's

employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

Specifications

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SPEC. 01 CONSTRUCTION ENGINEERING

CONSTRUCTION ENGINEERING PART 1 - GENERAL

1.1 DESCRIPTION

Under this item the Contractor shall perform the Construction Engineering, including layout to complete the work specified in the Contract Documents.

1.2 QUALITY REQUIREMENTS

- A. Accuracy: The layout of control points, centerlines, benchmarks and other items shall be consistent with standard engineering practices. All surveys, not covered by other sections of these specifications, required for the layout of the work specified in the Contract Documents shall be of second-order class I, or better, as defined in "Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys" prepared by the Federal Geodetic Control Committee for the U.S. Department of Commerce.

CONSTRUCTION ENGINEERING PART 2 - MATERIALS

2.1 FIELD BOOKS AND PAPER

- A. The field books shall be the standard six (6) ring field book (6 1/2" X 8") normally used in surveying.
- B. The paper shall be the standard six (6) hole paper (5 1/2" X 7 1/4") normally used in surveying.

CONSTRUCTION ENGINEERING PART 3 - EXECUTION

3.1 REQUIREMENTS

- A. The Contractor shall perform all necessary construction engineering, including layout, to insure that the work conforms to the lines, locations, grades, and elevations shown on the Contract Documents. The construction engineering shall include establishing all necessary lines, points, corners, etc. with adequate references for the recovery of

said items during construction, running a level circuit to establish additional benchmarks for use during construction, setting stakes for structures, slopes, subgrade, paving, and any other stakes required for control lines and grades.

- B. The Contractor shall furnish all equipment, personnel, and materials including stakes, templets, straightedges, and other devices necessary for performing the construction engineering.
- C. Field notes shall be kept in standard field notebooks supplied by the Contractor in a clear, orderly, and neat manner consistent with standard engineering practices and procedures. The field books shall be available for inspection by the Engineer at all times and shall become the property of the Owner on completion of the work.
- D. When staking culverts or inlets, the Contractor shall perform the necessary checking to establish the proper location and grade to fit best the conditions on the site. The Engineer shall approve the location of each structure prior to the installation of the culvert or inlet.
- E. The Engineer may check the accuracy of the construction engineering as necessary, but will assume no responsibility for the accuracy of engineering layout or the final result of construction accuracy.
- F. The supervision of the Contractor's construction engineering personnel shall be the responsibility of the Contractor and any errors resulting from the operations of such personnel shall be corrected at the expense of the Contractor and at no additional cost to the Owner.

CONSTRUCTION ENGINEERING

PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. There will be no measurement of construction engineering.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for construction engineering. The cost of this work is to be included by the Contractor in the total cost of the contract.

SPEC. 02 CLEARING AND GRUBBING

CLEARING AND GRUBBING PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall consist of clearing, grubbing, removing, and disposing of all vegetation and debris within the limits of the right-of-way and the construction limits of this project, except those objects that are designated to remain or are to be removed in accordance with other sections of these specifications. This work shall include the prevention of injury or defacement of all vegetation or other objects designated to remain.

CLEARING AND GRUBBING PART 2 - CONSTRUCTION REQUIREMENTS

2.1 GENERAL

- A. Right-of-way lines and construction lines will be established. Trees, shrubs, plants, and other things to remain will be designated and shall be preserved by the Contractor.
- B. Any damage to natural terrain, vegetation, trees, shrubs, plants, or other objects, designated to remain shall be repaired with no additional payment. Tree wound dressing for cut or scarred surfaces of trees or shrubs shall be in accordance with Section 914.09 (c) of Indiana Department of Transportation Standard Specifications current edition.
- C. Dressing for treating tree wounds or cuts shall be one of the following:
 - 1. An approved black asphaltum base antiseptic paint.
 - 2. An approved black paint consisting of Bordeaux Mixture, raw linseed oil, and lampblack.
 - 3. An approved black paint consisting of zinc oxide, raw linseed oil, and lampblack.

2.2 CLEARING AND GRUBBING

- A. Surface objects, trees, stumps, roots, rocks, and other protruding objects not designated to remain shall be cleared and grubbed. Undisturbed sound stumps, roots, and nonperishable solid objects may be left provided that they are a minimum of three (3) feet below the subgrade or final grade on slopes and embankments. The Contractor shall not be permitted to bury cleared materials on the project site.
- B. Burning of perishable materials shall be done only in accordance with local and state laws and ordinances.
- C. Perishable materials and debris shall be removed from the project site and disposed of at locations off the site. Written permission shall be obtained from the property owner on whose property the materials and debris are to be placed. Materials and debris shall not be disposed of in low lying areas or wetlands.

CLEARING AND GRUBBING PART 3 - PAYMENT

3.1 METHOD OF MEASUREMENT

- A. There will be no measurement of clearing and grubbing.

3.2 BASIS OF PAYMENT

- A. There will be no separate payment for clearing and grubbing. The cost of this work is to be included by the Contractor in the total cost of the contract.

SPEC. 03 EXCAVATING, BACKFILLING, AND COMPACTING

EXCAVATING, BACKFILLING, AND COMPACTING PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. Work included: Excavate, backfilling, compact, and grade the site to the lines and elevations shown on the plans, cross section, typical cross sections, and construction standards, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the soil engineer and soils report (if made a part of the Construction Contract).

EXCAVATING, BACKFILLING, AND COMPACTING PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension, and with not more than fifteen (15) percent of the rocks or lumps larger than 2 3/8" in their greatest dimension.
 - 2. Fill material is subject to the approval of the soil engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soils free from roots and other deleterious matter.

3. Do not permit rocks having a dimension greater than 1" in the upper 12" of fill or embankment.
4. Cohesionless material used for structural backfill: Provide sand free from organic material and other foreign matter, and as approved by the soil engineer.
5. Where granular base is called for under building slabs, provide aggregate complying with requirements of ASTM C30 uniformly graded and clean.

2.2 WEED KILLER

- A. Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this Work by governmental agencies having jurisdiction.

2.3 TOPSOIL

- A. Where and if shown on the Drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy, or stiff clay, stones larger than 1" in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

2.4 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

EXCAVATION, BACKFILLING AND COMPACTING

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2

PROCEDURES

- A. The Contractor shall proceed with caution during excavation so the exact location of underground utilities and structures, both known and unknown, may be determined. The Contractor shall be responsible for the repair of utilities and structures when broken or otherwise damaged.
- B. Whenever, in the opinion of the Engineer, it is necessary to explore and excavate to determine the location of underground structures, the Contractor shall make explorations and excavations for such purpose.
- C. Utilities:
 - 1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
 - 2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 - 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 - 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instruction.
 - 5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.
- D. Protection of persons and property:
 - 1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
 - 4. The Contractor shall so conduct the work that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the work, unless he shall have first obtained the property owner's written consent thereto and shall have shown said written consent to the Engineer.

- E. Dewatering:
Keep excavations free from water until foundations, structures, and piping are completed and will safely withstand forces generated by water. Provide sufficient dewatering equipment and make proper arrangements for the disposal of water from dewatering operation. Dewatering shall not damage property, create nuisances, or interfere with other work. Do not use sanitary sewers for the disposal of water from dewatering operations.
- F. Erosion Control:
Erosion control is required for all work. Soil erosion control consists of mechanical and vegetative type measures taken by the Contractor to prevent erosion of soil during the construction process. It shall be the responsibility of the Contractor during construction to prevent such detrimental soil erosion, to the satisfaction of the Engineer, from occurring during the prosecution of the work.
- G. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- H. Maintain access to adjacent areas at all times.

3.3 EXCAVATING

- A. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades, and elevations indicated on the plans and specified herein.
- B. Satisfactory excavated materials:
 - 1. Transport to, and place in, fill, or embankment areas within the limits of the Work.
- C. Surplus materials:
 - 1. Dispose of unsatisfactory excavated material, and surplus satisfactory excavated material, away from the site at disposal areas arranged and paid for by the Contractor.
- D. Excavation of Rock:
 - 1. Where rocks, boulders, granite, or similar material is encountered, and where such material cannot be removed or excavated by conventional earth moving or ripping equipment, take required steps to proceed with the general grading operations of the Work, and remove or excavate such material by means which will neither cause additional cost to the Owner nor endanger buildings or structures whether on or off the site.
 - 2. Do not use explosives without written permission from the Engineer.

- E. Excavate and backfilling in a manner and sequence that will provide proper drainage at all times.
- F. Borrow:
 - 1. Obtain material required for fill or embankment in excess of that produced within the grading limits of the Work from borrow areas selected and paid for by the Contractor and approved by the Engineer.
- G. Ditches and gutters:
 - 1. Cut accurately to the cross sections, grades, and elevations shown.
 - 2. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the Work.
 - 3. Dispose of excavated materials as shown on the Drawings or directed by the Engineer; except do not in any case, deposit materials less than 3' 0" from the edge of a ditch.
- H. Unauthorized excavation:
 - 1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Engineer or the soil engineer.
 - 2. Under footings, foundations, or retaining walls:
 - a. Fill unauthorized excavations by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.
 - b. When acceptable to the soil engineer, lean concrete fill may be used to bring the bottom elevation to proper position.
 - 3. Elsewhere, backfilling and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the soil engineer.
- I. Stability of excavations:
 - 1. Slope sides of excavations to 1:1 or flatter.
 - 2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
 - 3. Maintain sides and slopes of excavations in a safe condition until completion.
- J. Shoring and bracing:
 - 1. Provide materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
 - 2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
 - 3. Carry shoring and bracing down as excavation progresses.

- K. Excavating for structures:
1. Conform to elevations and dimensions shown within a tolerance of 0.10 ft, and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required, and for inspection.
 2. In excavating for footings and foundations, take care not to disturb bottom of excavation:
 - a. Excavate by hand tools to final grade just before concrete is placed.
 - b. Trim bottoms to required lines and grades to leave solid base to receive concrete.
 3. Excavate for footings and foundations only after general site excavating, filling, and grading are complete.
- L. Excavating for pavements:
1. Cut surface under pavements to comply with cross sections, elevations, and grades.
- M. Cold weather protection:
1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.
- N. Appurtenances:
1. Included in the unit price for Common Excavation will be the cost for removing, maintaining, and relocating any objects as needed to proceed with the work. This work shall include, but is not limited to, removing signs, maintaining them in temporary locations, and relocating them; removing manholes, maintaining them in a temporary location and relocating them as directed by the Engineer.

3.4 FILLING AND BACKFILLING

- A. General:
1. For each classification listed below, place acceptable soil material in layers to required subgrade elevations.
 2. In excavations:
 - a. Use satisfactory excavated or borrow material.
 3. Under asphalt pavements:
 - a. Use subbase materials.
 4. Under building slabs:
 - a. Use granular fill, if so called for on the Drawings, complying with aggregate in conformance with ASTM C30, uniformly graded and clean.

- B. Backfilling excavations as promptly as progress of Work permits, but no until completion of the following:
1. Acceptance of construction below finish grade including, where applicable, dampproofing, and waterproofing.
 2. Inspecting, testing, approving, and recording locations of underground utilities.
 3. Removing concrete formwork.
 4. Removing shoring and bracing and backfilling of voids with satisfactory materials.
 5. Removing trash and debris.
 6. Placement of horizontal bracing on horizontally supported walls.
- C. Ground surface preparation:
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious matter from ground surface prior to placement of fills.
 2. Plow, strip, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so that fill material will bond with existing surface.
 3. When existing ground surface has a density less than that specified under "compacting" for the particular area, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
 4. At exposed soils in areas to be paved, scarify to a minimum depth of 6", and recompact at a moisture content that will permit proper compaction as specified for fill.
- D. Placing and compacting:
1. Place backfilling and fill materials in layers not more than 8" in loose depth.
 2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
 3. Compact each layer to required percentage of maximum density for area.
 4. Do not place backfilling or fill material on surfaces that are muddy, frozen, or containing frost or ice.
 5. Place backfilling and fill materials evenly adjacent to structures, to required elevations.
 6. Take care to prevent wedging action of backfilling against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
 7. Where the construction includes basement or other underground walls having structural floors over them, do not backfilling such walls until the structural floors are in place and have attained sufficient strength to support the walls.

A. General:

1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
2. Smooth the finished surfaces within specified tolerance.
3. Compact with uniform levels or slopes between points where elevations are shown on the Drawings or between such points and existing grades.
4. Where a change of slope is indicated on the Drawings, construct a rolled transition section having a minimum radius of approximately 8' 0", unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.

B. Grading outside building lines:

1. Grade areas adjacent to buildings to achieve drainage away from the structures and to prevent ponding.
2. Finish the surfaces to be free from irregular surface changes, and:
 - a. Shape the surface of areas scheduled to be under walks to line, grade, and cross section, with finished surface not more than 0.10 ft above or below the required subgrade elevation.
 - b. Shape the surface of areas scheduled to be under pavement to line, grade, and cross section with finished surface not more than 0.05 ft. above or below the required subgrade elevation.

3.6 COMPACTING

A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557.

B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place and as approved by the soil engineer.

1. Structures:
 - a. Compact the top 8" of subgrade and each layer of fill material or backfilling material at 95 percent of maximum dry density.
2. Lawn and unpaved areas:
 - a. Compact the top 8" of subgrade and each layer of fill material or backfilling material at 90 percent of maximum dry density.
 - b. Compact the upper 12" of filled areas, or natural soils exposed by excavating, at 85 percent of maximum dry density.
3. Walks:
 - a. Compact the top 8" of subgrade and each layer of fill material or backfilling material at 95 percent of maximum dry density.

4. Pavements:
 - a. Compact the top 8" of subgrade and each layer of fill material or backfill material at 95 percent of maximum dry density.
 5. Ball Diamonds:
 - a. Compact the top 8" of subgrade and each layer of fill material or backfilling material at 90 percent of maximum dry density.
 - b. Compact the upper 12" of filled areas, or natural soils exposed by excavating, at 85 percent of maximum dry density.
- C. Moisture control:
1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the soil engineer.

3.7 FIELD QUALITY CONTROL

- A. Secure the soil engineer's inspection and approval of subgrades and fill layers before subsequent construction is permitted thereon.
- B. Provide at least the following tests to the approval of the soil engineer:
 1. At paved areas, at least on field density test for every 2000 sq. ft. of paved areas, but not less than three (3) tests;
 2. In each compacted fill layer, one (1) field density test for every 2000 sq. ft. of overlaying paved area, but not less than three (3) tests.
- C. If, in the Engineer's opinion based on reports of the testing laboratory, subgrade, or fills which have been placed are below specified density, provide additional compacting and testing.

3.8 MAINTENANCE

- A. Protection of newly graded areas:
 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds;

2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.
- B. Where completed areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

3.9 CERTIFICATION

- A. Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Engineer a written report from the soil engineer certifying that the compaction requirements have been obtained. State in the report the area of fill or embankment, the compaction density obtained, and the type or classification of fill material placed.

EXCAVATING, BACKFILLING, AND COMPACTING PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. There will be no measurement for excavating, backfilling, and compacting. The quantity shown in the Bid Proposal for "Common Excavation" will be used as the measured amount for the payment.
- B. The work needed to meet the requirements of this Section shall be paid for under the item "Common Excavation" and shall include, but not be limited to, the excavation, removal of excess material, topsoil removal, and replacement, protection of utilities, dewatering, shoring, and bracing, ground surface preparation, fill materials, grading, compacting, soils engineer's inspection, and testing.
- C. Common Excavation shall be bid in cubic yards to establish a unit price only. If the limits of the project are not changed, the basis of payment will be the total bid proposal quantity only. Any request by the Contractor for additional payment for excavating, backfilling, and compacting shall be made in writing to the Engineer before commencement of alleged additional work.
- D. Measurement on a Linear Basis. When either or both the plans and contract provide for an item of linear grading, the measurement for payment shall be based on the length of footage actually constructed to the lines, grades and typical cross sections specified. All classes of excavation involved, including required borrow and overhaul,

will not be measured but will be considered as included in the item for linear grading per foot.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for excavating, backfilling, and compacting. The cost of this work is to be included by the Contractor in the total cost of the contract.**

SPEC. 04 FINISHING SHOULDERS, DITCHES, AND SLOPES

FINISHING SHOULDERS, DITCHES, AND SLOPES PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall consist of the final shaping and dressing of shoulders, ditches, and slopes by hand or by machine methods, or both, to the required smoothness in accordance with these specifications and in close conformance with the elevations, grades, typical cross sections, and cross sections shown on the plans or on the construction standards.

FINISHING SHOULDERS, DITCHES, AND SLOPES PART 2 - CONSTRUCTION REQUIREMENTS

2.1 FINISHING SHOULDERS

- A. Unless otherwise provided, shoulders shall be constructed of earth or other approved material which contains no sod, weeds, sticks, roots, or other perishable matter. The inside edges shall be built up slightly above the finished surface of the adjoining pavement and compacted thoroughly with a roller weighing no less than five (5) tons and with the roller wheel slightly overlapping the pavement. Rolling shall continue until there is no break between the pavement and shoulders, and until the required cross section is obtained.
- B. In those areas where rolling is not practicable on shoulders for approach pavements or other miscellaneous areas, compaction shall be obtained with mechanical tamps, vibrators, or other satisfactory means. Except where permission has been granted to widen shoulders to dispose of surplus excavation, the outside edges shall be parallel to the pavement edges.

2.2 FINISHING DITCHES

- A. Ditches shall be finished to the lines and grades shown on the plans, typical cross sections and cross sections or as otherwise directed by the Engineer. The edges shall be parallel to the pavement unless it is necessary to have the ditch gradient different from that of the pavement in order to obtain proper drainage.

2.3 FINISHING SLOPES

- A. All cut and fill slopes shall be constructed to the typical cross sections and cross sections shown on the plans or to revised sections where cuts are widened to obtain additional material or fills widened to utilize excess. Cut and fill slopes shall be finished to the degree ordinarily obtained by a blade grader, scraper, or hand shovel.

FINISHING SHOULDERS, DITCHES, AND SLOPES

PART 3 - PAYMENT

3.1 METHOD OF MEASUREMENT

- A. Finishing of shoulders, ditches, and slopes will not be measured.

3.2 BASIS OF PAYMENT

- A. There will be no separate payment for finishing of shoulders, ditches, and slopes. The cost of this work is to be included by the Contractor in the total cost of the project.

SPEC. 05 CATCH BASINS, INLETS, MANHOLES, AND SPECIAL STRUCTURES

CATCH BASINS, INLETS, MANHOLES, AND SPECIAL STRUCTURES PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall consist of catch basins, inlets, manholes, and special structures, together with the necessary gray cast iron or ductile cast iron frames, grates, or lids, all constructed in accordance with the specifications, where indicated or directed by the Engineer, and conforming in all respects to lines, grades, and dimensions shown on the plans and the construction standards, unless otherwise directed by the Engineer.
- B. In these specifications, catch basins, inlets, manholes, and special structures are referred to as structures.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. Comply with requirements of all governmental agencies having jurisdiction.

CATCH BASINS, INLETS, MANHOLES, AND SPECIAL STRUCTURES PART 2 - MATERIALS

2.1 CATCH BASINS, INLETS, AND SPECIAL STRUCTURES

- A. All materials for structures shall comply with the material requirements for manholes in these specifications.

MANHOLES

A. Reinforced Concrete Manholes

These manholes shall be erected of precast, or cast in place, reinforced concrete sections to the shape of the manhole. Steps shall be cast in place in accordance with the standards as shown on the construction standards. All concrete, reinforcing and wall thickness shall be in accordance with ASTM Designation C-478 latest edition. All manhole joints shall be watertight and constructed in accordance with ASTM Specification C-443 latest edition. The bottom of the structures shall be of either precast, poured in place, or monolithic bottom stack, with 3,000 psi concrete to conform to the plans and shall be at least eight (8) inches thick and shall be reinforced as shown on the construction standards.

B. Steps

Manhole steps shall be furnished and installed as per the Construction Standards. The steps shall be located as follows:

1. The first step shall be positioned no greater than thirty-six (36) inches from the finished surface grade.
2. The last step shall be so situated that it is no greater than twenty-four (24) inches from the spring line or invert of the outfall pipe, whichever is less.
3. The maximum acceptable step spacing shall be sixteen (16) inches.
4. All steps shall be either cast iron or approved non-corrosive fiberglass materials. Cast iron steps shall be tumbled or sand-blasted and all burrs and sharp edges shall be removed. All materials used in the manufacture of steps shall conform to the latest edition of ASTM Specifications.

C. Material for Jointing Manholes

Material for jointing masonry manhole units shall be one (1) part Portland Cement to not less than one (1) part nor more than two (2) parts Mason's sand, mixed with the least amount of clean water necessary to provide a workable mixture.

D. Precast Manhole Components

Precast manholes shall conform with ASTM C-478, latest edition, and with design dimensions. Cones and sections shall be substantially free from fractures, large or deep cracks and surface roughness. Slabs shall be sound and free from gravel pockets. All precast manhole components shall be manufactured by an experienced and reputable manufacturer whose precast manhole components have been used commercially for at least three (3) years.

- E. Monolithic Concrete Manholes
Monolithic concrete manholes shall conform to the contract drawings and /or the construction standards, unless otherwise specified by the Engineer. Walls and base dimensions, weights, and finish preparation shall conform to the appropriate construction standards, unless otherwise designated by the Engineer.
- F. Cast Iron Frames, Covers, and Steps
Gray cast iron frames, covers, and steps shall conform to the requirements of ASTM A48 for Gray Cast Iron, latest edition. The dimensions, weights, and finish preparations shall conform to the appropriate construction standards, unless otherwise designated by the Engineer.
- G. Ductile Cast Iron Frames, Covers, and Grates
Ductile cast iron frames, covers, and grates shall conform to the requirements of ASTM A536 for Ductile Cast Iron, latest edition. The dimensions, weights, and finish preparation shall conform to the appropriate construction standards, unless otherwise designated by the Engineer.

CATCH BASINS, INLETS, MANHOLES, AND SPECIAL STRUCTURES

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 EXCAVATION

- A. Excavation shall be to the established bottom of the foundations. The finished surface shall be firm and smooth. If soft or yielding spots are encountered at this elevation, they shall be removed, backfilled with suitable material, and tamped into place. If rock is encountered at the bottom elevation, the excavation shall be carried down 6 inches further and backfilled with approved material tamped to the required elevation.

3.2 DEWATERING

- A. Dewatering of the site shall conform to the same requirements as for sewer trench dewatering.
- B. Sub-base preparation as an adequate foundation for all manhole structures shall be obtained by removal and replacement of unsuitable material with crushed stone, or by such other means as provided for foundation preparation of the connected sewers.

3.3 BEDDING

- A. Precast Base section shall be placed on a well-graded granular bedding course conforming to the requirements for sewer bedding, but not less than four (4) inches in thickness and extending to the limits of the excavation. The bedding course shall be firmly tamped and made smooth and level to assure uniform contact and support of the precast element.

3.4 CAST-IN-PLACE BASES

- A. Unless otherwise specified, cast-in-place bases shall be at least eight (8) inches in thickness and shall extend at least six (6) inches radially outside of the outside dimensions of the manhole section. The cast-in-place base shall be made of 3,000 psi concrete, 28-day compression test, and shall be reinforced as shown on the construction standards, or unless otherwise specified.

3.5 LIFT HOLES AND JOINTS

- A. All lift holes and all joints between precast elements in manholes shall be thoroughly wetted and then be completely filled with non-shrinking concrete grout, smoothed and painted both inside and out, to ensure water tightness.
- B. All joints between precast elements in manholes shall be made with an approved bitumastic material or an approved rubber gasket in accordance with ASTM C443, latest edition.
- C. Precast sections shall be placed and aligned to provide vertical sides and vertical alignment of the ladder rungs. The completed manhole shall be rigid, true to dimensions, and be watertight.

3.6 MANHOLE WEEP HOLES

- A. Four (4) inch weep holes shall be constructed in all manholes where water jetting of the sewer trench is required. The weep holes shall be plugged with non-shrinking concrete grout after the compaction has been completed for the trench backfill material.

3.7 PLACING OF CASTINGS

- A. Castings placed on concrete surfaces shall be set in full grout beds. The grout shall be mixed in proportion of one (1) part Portland Cement to three (3) parts sand, by volume, based on dry materials. Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary, or unless otherwise specified by the Engineer.

3.8 STREETS AT GRADE

- A. Where work is in paved streets or areas which have been brought to grade, not more than fifteen (15) inches shall be provided between the top of the cone or slab and the underside of the manhole casting for adjustment of the casting to street grade.

3.9 UNPAVED STREETS OR ALLEYS

- A. Where work is in the unimproved street or alley, not less than twelve (12) inches of adjusting rings shall be provided between the top of the cone or slab and the underside of the manhole casting for adjustment of the casting to finished grade. The top of the manhole casting shall be flush with the finished grade, unless otherwise directed by the Engineer.

3.10 MANHOLES WITHIN CULTIVATED & NON-CULTIVATED AREAS

- A. Where work is in cultivated areas, the top of the manhole casting shall be buried three (3) feet, and in non-cultivated areas, the casting shall be flush with the finished grade, unless otherwise directed by the Engineer.

3.11 REDUCING CONE

- A. Where the last manhole section is a reducing cone and is set to final grade as required by the Engineer; then if as part of continuous work, it becomes necessary to lower this casting and it entails going below the cone, compensation to the Contractor will be allowed for said adjustment and changing of the manhole stacks.

3.12 ADJUSTING RINGS

- A. When adjusting rings are used to set the castings to grade, they shall be pointed up and made watertight.

3.13 CHANNELS AND INVERTS

- A. Channels and inverts shall be made to conform accurately to the sewer characteristics and grades, and shall be brought together smoothly with well-rounded junctions, satisfactory to the Engineer and in conformance with the construction standards, unless otherwise directed.

3.14 PIPE CONNECTIONS

- A. Special care shall be taken to see that the opening through which pipes enter the structure have all pipe ends sawed and smoothed completely. Pipes are to be firmly full of jointing material to ensure watertightness. The pipes shall not protrude farther than three (3) inches into the inside face of the manhole, measured along the horizontal center of the pipe.
- B. In case of smooth sidewall pipe, rubber water stops, "O"-Ring gaskets, or poured-in-place pipe, sleeves shall be used for watertightness between the pipe and manhole. When new holes are required in the manhole, they shall be core drilled or star drilled in a circle of the required diameter and then knocked out. In no instance shall new holes be sledge-hammered.

3.15 SANITARY SEWER DROP MANHOLE CONNECTIONS

- A. An exterior drop pipe should be provided for a sewer entering a manhole at an elevation of greater than twenty-four (24) inches or more above the manhole downstream invert. The minimum diameter of a drop manhole shall be forty-eight (48) inches. The diameter of the drop pipe shall be a minimum of eight (8) inches and a maximum of twelve (12) inches in diameter, unless otherwise specified. Drop manhole connections shall conform in all respects to the construction standards.

CATCH BASINS, INLETS, MANHOLES, AND SPECIAL STRUCTURES
PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. All catch basins, inlets, manholes, and special structures will be measured by the unit.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for individual structures. The cost of this work is to be included in the total cost of the contract.

SPEC. 06 CORRUGATED METAL PIPE

CORRUGATED METAL PIPE PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall consist of the installation of corrugated metal pipe in accordance with these specifications and in conformance with the Drawings (plans), cross sections, typical cross sections and construction standards.

1.2 QUALITY ASSURANCE

- A. The Contractor shall provide the name of the manufacturer and the supplier where the corrugated metal pipe was purchased. The gauge of the pipe shall be marked on the pipe. If the gauge is not marked by the manufacturer or supplier, then it shall be marked by the Contractor with spray paint or other suitable means.
- B. All corrugated metal pipe shall be manufactured by an experienced and reputable manufacturer whose pipe has been used commercially for at least three (3) years.

CORRUGATED METAL PIPE PART 2 - PRODUCTS

2.1 CORRUGATED METAL PIPE MATERIALS

- A. This pipe and the coupling bands shall be galvanized steel or aluminum coated steel in accordance with AASHTO M 36, Type III and IIIA except as follows:
 - 1. Resistance spot welded lap joints will not be permitted.
 - 2. Band couplers shall have corrugations that mesh with the corrugations of the pipes. Type IIIA may only be used in place of 6 inch round pipe.
- B. If the corrugated metal pipe is to be bituminous coated, it shall be in accordance with Section 902.07 of the Standard Specifications of the Indiana Department of Transportation for Type A coated pipe. Type A is fully bituminous coated corrugated steel or aluminum pipe.

CORRUGATED METAL PIPE
PART 3 - CONSTRUCTION REQUIREMENTS

3.1 PIPE TRENCH EXCAVATION

- A. The trench excavation for corrugated metal pipe shall begin at the outlet end and proceed towards the upper end. The trench shall be of sufficient width to provide ample working space on both sides of the pipe and to provide space for proper compaction of the backfill around the pipe.
- B. If the trench excavation is made too deep, proper pipe bedding shall be made by backfilling with an approved material to the required elevation. The backfill material shall be compacted into place in order to prevent settling of the pipe or erosion of the backfill.
- C. If stable soils are not found at the required trench bottom grade, the trench shall be excavated at least six (6) inches below the proposed bottom of the CMP elevation, then the trench shall be backfilled, compacted, and shaped to the required elevation. Backfilling shall be with an approved material only. Backfilling with loose, granular sands, pea gravel or other waterbearing materials will not be permitted.
- D. If rock is encountered at the required trench bottom grade, the trench shall be excavated at least six (6) inches below the proposed bottom of the CMP elevation. Then the trench shall be backfilled, compacted, and shaped to the required elevation.

3.2 LAYING PIPE

- A. Corrugated metal pipe shall not be laid on frozen or muddy trench bottom. CMP shall have a firm bearing for its entire length. Placement of the pipe shall begin at the outlet end and proceed upstream. The Contractor shall place the pipe according to the lines, grades and elevations indicated on the plans and construction standards.

3.3 BACKFILLING

- A. Backfill material shall be placed around and over the CMP in six (6) to eight (8) inch lifts. Each lift shall be compacted with caution in order to insure that the pipe is not crushed or displaced.

CORRUGATED METAL PIPE
PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Corrugated metal pipe (CMP) will be measured on a linear foot basis for the size, type, and gauge indicated on the plans or construction standards. Measurement will be made of the pipe in place only. No measurement will be made of the excavation, backfill, joints, fittings and other items necessary for a complete installation unless listed as a separate bid item.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for corrugated metal pipe. The cost of this work is to be included by the Contractor in the total cost of the contract.
- B. Trench excavation, dewatering of the trench, base stabilization, backfill material, compaction, fittings, joints, bedding material, replacement/repair of farm field tile encountered, protection/repair of other utilities, disposal of excess excavated material, and all other construction items and materials necessary to completely install corrugated metal pipe according to the plans, these specification and construction standards will not be paid for separately. The cost of the above items shall be included in the linear foot cost of CMP. No additional or separate payment shall be made for these items unless listed in the Bid proposal by the Engineer as a separate pay item.

SPEC. 07 CULVERTS, STORM AND SANITARY SEWERS

CULVERTS, STORM AND SANITARY SEWERS PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall consist of the construction, or reconstruction, of culverts, storm or sanitary sewers, in accordance with these specifications and in reasonably close conformance with the lines and grades shown on the plans or as directed.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. Comply with requirements of all governmental agencies having jurisdiction.

CULVERTS, STORM AND SANITARY SEWERS PART 2 - MATERIALS

2.1 PIPE MATERIAL

- A. Pipe used in sanitary sewer construction shall be P.V.C. Pipe (SDR-35), or extra strength clay pipe, whichever is itemized on the pipe proposal. All sanitary sewer pipe shall have flexible gasketed joints. Sanitary sewer pipe larger than 12" diameter may be reinforced concrete pipe of the proper class (no less than class III).
- B. Storm sewers, unless otherwise specified, shall be concrete or corrugated metal pipe.
- C. All sewer pipe shall be manufactured by an experienced and reputable manufacturer whose pipe has been used commercially for at least three (3) years, and shall conform to the applicable specifications and requirements set forth herein.

- D. The type and class of pipe to be used shall be as shown on the plans or as described herein.
1. Concrete Pipe, Plain and Reinforced
Concrete pipe shall conform in all respects with ASTM C14, AASHTO M86, and Federal SS-P-371 for Non-Reinforced Concrete Pipe. ASTM C76, AASHTO M170, and Federal S-P-375 for Reinforced Concrete Pipe. ASTM C361 for Reinforced Low Head Concrete Pipe.
 2. Clay Pipe
Clay pipe shall conform in all respects to ASTM C700 for Extra Strength Clay Pipe.
 3. P.V.C. Pipe (SDR-35)
P.V.C. sewer pipe shall conform to requirements of ASTM C 3034 for the specified sized. The pipe SDR number shall be 35. The Contractor shall provide a pipe certification to the Engineer.

2.2 JOINTING MATERIALS

- A. Flexible Gasketed Joints for Sanitary & Storm Sewers:
1. Flexible gasketed joints shall be rubber gasketed, unless otherwise specified, or shall be factory manufactured joints in accordance with ASTM Designation C-425 when used with clay pipe.
 2. Flexible rubber gasket joints for concrete sewer pipe shall conform to the requirements of ASTM Designation C-443, joints for circular concrete sewer and culvert pipe, using flexible watertight, rubber gaskets.

CULVERTS, STORM AND SANITARY SEWERS PART 3 - CONSTRUCTION REQUIREMENTS

3.1 SURVEY LINES AND GRADES

- A. All survey lines and grades shall be set by the Contractor.

3.2 CLEARING

- A. Areas within the project limits shall be cleared of logs, stumps, brush, vegetation, rubbish and other perishable matter. All rubbish or unsuitable material shall be removed completely. Material unsuitable for filling may not be disposed of on the project site.
- B. Trees shall not be damaged or removed unless such trees interfere with the construction of the work. In such cases, other trees shall be removed completely.

- C. The Contractor shall be responsible for obtaining any permission and necessary permits prior to commencing of any burning, and copies sent to the Engineer.

3.3 BEDDING

- A. Each pipe shall be laid in the bedding specified as shown on the plans or described in the Special Provisions and the construction standard drawings. Unless otherwise specified, the Contractor shall use a Class "B" bedding as shown in the construction standards.

- B. Definition of Terms for Bedding Explanation (see construction standards)

1. Bc = Outside diameter of pipe, in inches
2. H = Backfill cover above top of pipe, in inches
3. D = Inside diameter of pipe, in inches
4. d = Depth of bedding material below the pipe, in inches
5. The values of "d", depth of bedding material below the bell of the pipe shall be as follows:

| Minimum Requirements | |
|----------------------|----|
| 27" and smaller | 3" |
| 30" to 60" | 4" |
| 66" and larger | 6" |

- C. Class "A" Bedding (Concrete Cradle)

1. Class "A" bedding is that method of bedding in which the conduit is set on "d" inches of concrete in an earth foundation and encased in concrete up to 1/4" of "Bc" to fit the lower part of the conduit's exterior breadth. The remainder of the conduit is to be surrounded to a height of at least twelve (12) inches above its top by densely compacted granular backfill material carefully placed by hand to completely fill all spaces under and adjacent to the conduit, unless otherwise specified by the Engineer.
2. The fill to be tamped thoroughly on each side and under the conduit, as far as practicable, in layers not to exceed six (6) inches in thickness.
3. The concrete used for Class "A" bedding shall be plain concrete with a 28-day compressive strength of 3,000 psi, unless otherwise specified. Refer to "Pipe Bedding Details" of the Construction Standards for further details on Class "A" bedding.

- D. Class "B" Bedding

1. Class "B" bedding is that method of bedding in which the conduit is set on "d" inches of sand cushion in an earth foundation, carefully shaped to fit the lower part of the conduit exterior for a width of at least 60% of the conduit's breadth. The remainder of the conduit is to be surrounded to a height of at least twelve

(12) inches above its top by densely compacted granular backfill material carefully placed by hand to completely fill all spaces under and adjacent to the conduit. The fill to be tamped thoroughly on each side and under the conduit, as far as practicable, in layers not to exceed six (6) inches in thickness. Bell excavation is to be provided. Refer to "Pipe Bedding Details" of the Construction Standards for further details on Class "B" Bedding.

E. Class "C" Bedding

1. Class "C" bedding is that method of bedding in which the conduit is set on an earth foundation, carefully shaped to fit the lower part of the conduit exterior for a width of at least 50% of the conduit's breadth. The remainder of the conduit is to be surrounded to a height of at least twelve (12) inches above its top by lightly compacted granular backfill material carefully around the exterior of the conduit. Bell excavation is to be provided. Refer to "Pipe Bedding Details" of the Construction Standards for further details on Class "C" Bedding.

3.4 SEWER LINE CONNECTIONS

- A. Sewer line connections to trunks, mains, laterals, or side sewers shall be left uncovered until after an acceptance inspection has been made by the Engineer. After approval of the connection, the bare pipe shall be covered with compacted granular material to a minimum depth of twelve (12) inches above the crown of the pipe. The trench shall then be fully backfilled as required. No existing sewer, storm drain, or drain tile shall be connected to a sanitary sewer.

3.5 LAYING PIPE

- A. All pipe shall be reinspected for soundness and damage due to handling immediately before being lowered into the trench. Any pipe found to be unsound or damaged will be rejected and shall be removed immediately from the site of the work.
- B. All pipe shall be laid accurately to the required line and grade given by the Engineer and in such manner as to form a close, concentric joint with the adjoining pipe and to bring the invert of each section to the required grade. Bell holes shall be dug in advance of the pipe being laid as required. The supporting of the pipe on blocks will not be permitted.
- C. Pipe laying shall proceed upgrade, beginning at the lower end of the sewer, unless otherwise approved by the Engineer.

- D. All open ends of pipes and branches shall be sealed with plugs or bulkheads firmly held in place in a manner acceptable to the Engineer.
- E. No special payments will be made for the placement or removal of said plugs or bulkheads. At the end of each day's work, the open ends of all pipes shall be satisfactorily protected against the entrance of animals, earth or other materials.
- F. Each length of section shall be properly pulled or shoved "home" with a winch or come-a-long against the section previously laid to make a proper joint. The pipe shall then be securely held in position during the backfill operations. Joints shall not be pulled or cramped more than the design of the joint will permit and so as not to injure the conduit.

3.6 DEWATERING

- A. Dewatering sufficient to maintain the water level below the surface of the trench bottom shall be accomplished prior to pipe laying and jointing, if not done prior to excavation and placement of the bedding as called for. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench. When the dewatering operation is ended, the trench shall be replaced in such a manner so as not to disturb the pipe and its foundation.

CULVERTS, STORM AND SANITARY SEWERS

PART 4 - QUALITY ASSURANCE

4.1 INFILTRATION

- A. The allowable infiltration/exfiltration for any portion or section of the sanitary sewer shall not exceed 200 gpd/mile/inch of diameter of pipe.
- B. The test for infiltration shall be performed by the Engineer or his representative. They will be made for each pipe size and over the entire length of that size pipe, with the standard V-notch weir installation. The tests can, at the option of the Engineer, be made between manholes until the trouble area or areas have been located and corrected within the allowable limits of 200 gpd/mile/inch diameter of the pipe.

4.2 EXFILTRATION

- A. Water tests for exfiltration shall be performed by the Engineer or his representative. Necessary water, plugs, equipment, and labor shall be furnished by the Contractor,

unless otherwise provided. This test shall be made between two (2) successive manholes by closing the lower end of the sewer to be tested and the inlet sewer of the upper manhole with stoppers and filling the pipe and manhole with water to a point four (4) feet above the top of the pipe of the open sewer in the upstream manhole. The Engineer shall note the drop in head and calculate the leakage.

- B. If the infiltration/exfiltration in any section of the sewer is greater than the above mentioned figure, the Contractor shall not be paid for that section of sewer until the section is made watertight such that the infiltration is equal to or less than the above mentioned figure.

4.3 AIR TEST

- A. The test for exfiltration shall be performed by the Engineer or his representative. Necessary compressors, plugs, valves, and equipment and labor shall be furnished by the Contractor. The sewer line shall be sealed at each end between consecutive manholes. The seal at one end shall have an orifice through which to pass air into the pipe. An air supply shall be connected to the orifice, with appropriate shut-off valve and pressure gauge, reading between 0 and 5 psi. The pipeline shall be pressurized to a stabilized pressure of 3.5 to 4 psi for five (5) minutes. If necessary air shall be added to the line to maintain the pressure at 3.5 psi. The valve shall then be closed and timing started; when pressure drops to 2.5 psi, the test is over and the time is recorded. The lapsed leakage time is then checked against the formula for allowable leakage time.
- B. The formula for calculating allowable leakage time equals: Minimum pressure holding time in seconds equals the pipe diameter in inches multiplied by 75.
- C. Example: Minimum air holding time for 8" sewer equals $8 \times 75 = 600\text{s}$ or 10 minutes.

CULVERTS, STORM AND SANITARY SEWERS PART 5 - PAYMENT

5.1 METHOD OF MEASUREMENT

- A. The footage of pipe to be paid for will be based on the net length of pipe used, which shall be obtained by multiplying the nominal length of the sections by the number of sections used. When the pipe connects to manholes, inlets, or catch basins, terminal sections will be field measured to the outside face of the structure. The footage of beveled or skewed end sections of circular corrugated metal pipe shall be the average

of the top and bottom centerline lengths, and that for corrugated metal pipe-arches and concrete elliptical pipe shall be the bottom centerline length.

5.2 BASIS OF PAYMENT

- A. There will be no separate payment for culverts, storm and sanitary sewers. The cost of this work is to be included in the total cost of the contract.
- B. Special backfill, "B" borrow for pipe backfill, strutting, timber mats, excavation, removal of existing pipe and headwalls, concrete collars and encasements, class A concrete for sealing, material for joints, backfilling, shoring, dewatering, disposal of surplus material, pavement removal, pavement replacement, and all other incidental items needed to complete the work will not be paid for separately, but shall be included in the cost of pay items.

SPEC. 08 DRAIN TILE

DRAIN TILE

PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall consist of the installation of drain tile in accordance with these specifications and in close conformance with the plans, cross sections, typical cross sections, and construction standards.

DRAIN TILE

PART 2 - PRODUCTS

2.1 DRAIN TILE PIPE

- A. All drain tile pipe shall be manufactured by an experienced and reputable manufacturer whose pipe has been used commercially for at least three (3) years.
- B. Pipe used in drain tile construction will be either perforated, corrugated polyethylene (PE) pipe or perforated poly vinyl chloride (PVC) pipe.

2.2 PIPE MATERIAL

- A. Polyethylene (PE) Pipe
Corrugated polyethylene pipe for drain tile shall be perforated. This pipe shall conform to the requirements of the specifications of AASHTO M-252 and ASTM F-405. (This type of pipe is used extensively for agricultural drainage, leach beds, and building foundation drains and shall be as manufactured by Hancor or equal.)
- B. Poly Vinyl Chloride (PVC) Pipe
Poly vinyl chloride pipe for drain tile shall be perforated. This pipe shall conform to the specifications of ASTM d-3034 for the specified sizes. The pipe SDR (standard dimension ratio) number shall be 35. Poly vinyl pipe for drain tile shall be Type PSM SDR-35 PVC pipe.

DRAIN TILE
PART 3 - CONSTRUCTION REQUIREMENTS

3.1 TRENCH EXCAVATION

- A. The trench excavation for drain tile shall begin at the outlet end and proceed towards the upper end. The trench shall be of sufficient width to provide ample working space on both sides of the tile pipe and to provide space for proper compaction of the backfill around the tile.
- B. If the trench excavation is made too deep, proper pipe bedding shall be made by backfilling to the required elevation with sand, pea gravel, or other approved material. The back filled material shall be tamped into place and compacted in order to prevent settling of the pipe.
- C. If stable soils are not found at the required trench bottom grade, the unstable material shall be removed to a depth that provides adequate pipe support after being backfilled, compacted, and shaped to the required elevation.
- D. If rock is encountered at the required trench bottom grade, the trench shall be excavated at least six (6) inches below the proposed bottom of pipe elevation, then the trench shall be backfilled, compacted, and shaped to the required elevation.

3.2 LAYING TILE

- A. Tile pipe shall not be laid on frozen or muddy trench bottom. Tile pipe shall have a firm bearing for its entire length. Placement of tile pipe shall begin at the outlet end and proceed upstream. The Contractor shall place the pipe according to the lines, grades, and elevations indicated on the plans.
- B. The outlet end of the tile drain shall be equipped with a wire coil to prevent animals from entering the pipe.

3.3 BACKFILLING

- A. Backfill material shall be placed around and over the pipe in six (6) to eight (8) inch lifts. Each lift shall be tamped with caution in order to insure that the tile pipe is not crushed or displaced. The Contractor shall backfill the tile drain pipe in such a manner that displacement of the pipe does not occur. (This is a problem of particular concern with continuous coil PE pipe to "ride up" on top of the backfill material as it is being placed.)

DRAIN TILE

PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Drain tile will be measured on a linear foot basis for the size and type of pipe indicated on the plans. Measurement will be made of the drain tile in place only. No measurement will be made of fittings, joints, excavations, and backfill materials.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for drain tile. The cost of this work is to be included by the Contractor in the total cost of the contract.
- B. Trench excavation, backfill material, compaction, fittings, joints, disposal of excess excavated material, bedding material, replacement of farm field tile encountered, animal prevention coil, base stabilization, dewatering of the trench, and all other construction items and materials necessary to install a complete tile drain system according to the plans and these specifications will not be paid for separately. The cost of the above items shall be included in the linear foot cost of the drain tile. No additional or separate payment will be made for these items.

SPEC. 09 CAST-IN-PLACE CONCRETE

CONCRETE

PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. Work included: Provide cast-in-place concrete, including formwork and reinforcement, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.2 QUALITY ASSURANCE

- A. Comply with "Specifications for Structural Concrete for Buildings," ACI 301, except as may be modified herein.
- B. Provide access for, and cooperate with, the inspector and testing laboratory.
- C. Do not commence placement of concrete until mix designs have been reviewed and approved by the Engineer and all governmental agencies having jurisdiction, and until copies of the approved mix designs are at the job site and the batch plant.

1.3 SUBMITTALS

- A. Secure concrete mix designs from the testing laboratory and submit to the Engineer for review and approval.
- B. Distribute approved mix designs to testing laboratory, batch plant, job site, and governmental agencies having jurisdiction.

1.4 FIELD TESTS

- A. The following field and related laboratory tests shall be made by and at the expense of the Contractor when required or upon the request of the Engineer, and they shall be performed in strict accordance with the listed ASTM Specifications:

| TEST | ASTM SPECIFICATIONS |
|----------------|---------------------|
| Slump | C 143 |
| Air Content | C 173 |
| Test Cylinders | C 31 or C 513 |
| Core Samples | C 42 |

- B. Slump shall be measured each time test cylinders are to be made and at any other time upon request of the Engineer. The slump shall be not more than five (5) inches nor less than two (2) inches.
- C. Air content shall be measured each time test cylinders are to be made and at any other time upon request of the Engineer. In the event the air content is known prior to taking sample, the field test may be omitted.
- D. Test cylinders shall be made in sets of four (4). One (1) cylinder shall be field-cured and broken at seven (7) days. Three (3) cylinders shall be laboratory-cured and broken at twenty-eight (28) days. Contractor shall be responsible for all handling and transportation to an approved testing laboratory. Contractor shall submit to the Engineer three (3) copies of each testing laboratory report.
- E. A set of test cylinders shall be taken for each fifty (50) cubic yards of concrete placed or fraction thereof, or at any other time as required by the Engineer.

1.5 REFERENCE STANDARDS

- A. The publications listed in this section are hereby considered a part of this specification.
- B. The Contractor shall, at the request of the Engineer, maintain any or all of the publications on file at the job site. Latest revisions shall apply in all cases.
- C. All requirements of the referenced publications shall be strictly enforced whether or not specifically mentioned.
- D. American Concrete Institute
 - 1. ACI 318 Building Code Requirements for Reinforced Concrete.
 - 2. ACI 211.1 Recommended Practice for Selecting Proportions for Normal Weight Concrete.
 - 3. ACI 211.2 Recommended Practice for Selecting Proportions for Structural Lightweight Concrete.
 - 4. ACI 347 Recommended Practice for Concrete Formwork.
 - 5. ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - 6. ACI 308 Recommended Practice for Curing Concrete.
 - 7. ACI 306 Recommended Practice for Cold Weather Concreting.
 - 8. ACI 305 Recommended Practice for Hot Weather Concreting.
 - 9. ACI 304 Recommended Practice for Measuring, Mixing, and Placing Concrete.

1.6 TOLERANCES

- A. The following tolerances shall be considered the maximum permissible:
1. Variations from plumb 1/4 in. per 10 ft. but not more than 1 inch
 2. Variations from level or indicated grade 1/4 in. per 10 ft. but not more than 1/2 in.
 3. Variations from horizontal lines 1/4 in. per 10 ft. but not more than 1/2 in.
 4. Variations in size and locations of openings or sleeves 1/4 in.
 5. Variation in steps
Flight of Stairs
 Riser 1/8 in.
 Tread 1/4 in.
Consecutive Steps
 Riser 1/16 in.
 Tread 1/8 in.
 6. Reinforcing Steel 3/8 in

CONCRETE

PART 2 - MATERIALS

2.1 PRODUCTS

- A. Portland cement shall conform to the requirements of ASTM Specification C 150, Type I. Only one brand and manufacturer of approved cement shall be used for any one structure.
- B. Regular find and coarse aggregates shall conform to the requirements of ASTM Specification C 33.
- C. Lightweight fine and coarse aggregates shall conform to the requirements of ASTM Specifications.
- D. Insulating fine and coarse aggregates shall conform to the requirements of ASTM Specification C 332.
- E. Water shall be potable, clean, and free from injurious amounts of oils, acids, alkalis, organic materials, or other substances that may be deleterious to concrete or steel. A maximum of 500 mg/l of chloride ion may be present in the water.

- F. Reinforcing steel shall conform to the requirements of ASTM Specification A 615, Grade 60.
- G. Welded wire fabric or wire mesh shall conform to the requirements of ASTM Specification S 185.
- H. Air-entraining admixtures shall conform to the requirements of ASTM Specification C 260.
- I. Water-reducing and retarding admixtures shall conform to the requirements of ASTM Specification C 494.
- J. Curing compounds shall conform to the requirements of ASTM Specification C 309, Type I.
- K. Preformed expansion joint filler shall conform to the requirements of ASTM Specification D 1752, Type III.
- L. Hot-poured elastic joint filler shall conform to the requirements of ASTM Specification D 1190.
- M. Waterproof expansion joint filler shall conform to the requirements of ASTM Specification D 1850.
- N. Waterstops shall conform to the requirements of SCS Specification 537. Waterstops shall be of the general configuration as shown on the drawings.

2.2 GENERAL

- A. Concrete shall be Class A, B, C, or D. All concrete shall be assumed to be Class A unless specifically excepted.
- B. Concrete shall be measured, mixed, and placed in accordance with ACI 614.
- C. Maximum size of coarse aggregate shall be 3/4 inch.
- D. Unless specifically excepted, the air content by volume of all concrete shall be from four (4) to eight (8) percent.
- E. Unless specifically excepted, a water-reducing and retarding admixture shall be used in all Class A concrete. Use of this admixture is optional for other concrete.

- F. Prior to placing the first concrete at the job site, the proposed design mix shall be established and a set of four (4) test cylinder shall be made from the proposed mix. One (1) cylinder shall be broken at seven (7) days and the remaining three (3) 28-day breaks equal or exceed the required 28-day strength, the mix shall be considered satisfactory. Should the average strength of the three (3) 28-day breaks be less than the required 28-day strength, the design mix shall be adjusted and the test procedure shall be repeated.
- G. The water/cement ratio of the design mix shall not be exceeded at any time during the project.
- H. The watertightness of structural concrete shall be such that no measurable amount of water shall pass through the concrete in twenty-four (24) hours when a head of water of twelve (12) inches per inch of concrete is applied thereto.

2.3 CLASS A CONCRETE

- A. Class A concrete shall be structural concrete with a 28-day compressive strength of 4,000 psi.
- B. Class A concrete shall be proportioned in accordance with ACI 211.1

2.4 CLASS B CONCRETE

- A. Class B concrete shall be plain concrete with a 28-day compressive strength of 2,000 psi.
- B. Class B concrete shall be proportioned in accordance with ACI 211.1.
- C. All fillets shall be Class B concrete unless they are placed monolithic with a wall or slab.

2.5 CLASS C CONCRETE

- A. Class C concrete shall be structural lightweight concrete with a 28-day compressive strength of 3,000 psi.
- B. Class C concrete shall be proportioned in accordance with ACI 211.2
- C. The maximum density shall be 115 pcf.

2.6 CLASS D CONCRETE

- Class D concrete shall be insulating concrete with a 28-day compressive strength of 140 psi.
- B. The minimum density shall be 24 pcf.
- C. The minimum thickness of in-place Class D concrete shall be one (1) inch and the maximum thickness shall be eight (8) inches.
- D. Foot traffic shall be limited on new concrete until the roofing material has been applied.
- E. Application shall be in strict accordance with manufacturer's recommendations.

2.7 SITE-MIXED CONCRETE

- A. Site-mixed concrete shall be thoroughly mixed in approved type batch mixer having a capacity of not less than 1/2 cubic yard. The volume of the mixed batch shall not exceed the manufacturer's rated capacity of the mixer;
- B. The mixing time for each batch, after addition of water to cement and aggregate, shall not be less than 1 1/2 minutes for each one (1) cubic yard of materials. The mixing drum shall operate at the speed for which it was designed, provided said speed is more than 14 rpm and less than 20 rpm.

2.8 READY-MIXED CONCRETE

- A. All ready-mixed concrete shall be mixed, delivered, and placed in accordance with ASTM Specification C 94.
- B. Concrete shall be discharged from the truck within 1 1/2 hours after the water has been added to the mix.
- C. The delivery ticket shall contain the cubic yards in the load, the percent of air, the total number of bags of cement in the load, and the total gallons of water in the load.
- D. Water may be added at the job site on the condition that the water-cement ration that results upon addition of the water does not exceed the maximum allowable ratio as described elsewhere in these specifications. Upon addition of any water at the job site, there shall be a minimum of 1 1/2 minutes of mixing per each cubic yard remaining in the truck.

2.9 REINFORCING STEEL

- A. Reinforcement shall be free from excessive amounts of scale, rust, form oil, or any other coating that will reduce bond.
- B. Reinforcement shall be cut and bent in accordance with recommended practices contained in ACI 315.
- C. Bar supports shall conform to standards recommended in ACI 315.
- D. Any dowel or lap shown on the drawings and not dimensioned and any splices required but not shown shall be the minimum allowable Class B tension splice according to ACI 318, based on Grade 60 steel reinforcing and 3,000 psi 28-day concrete.
- E. A mat of steel shall be considered as two layers of reinforcing bars forming a grid. When one mat of steel is to be placed in a wall or slab, it shall be placed in the center of the section unless specifically expected. When two (2) mats of steel are to be placed in a wall or slab, one mat shall be placed in each face of the section utilizing the minimum allowable clear distance per ACI 318 unless specifically excepted.

2.10 CALCIUM CHLORIDE

- A. Calcium chloride shall be considered for approval as an accelerating admixture during cold weather construction.
- B. Calcium chloride shall conform to the requirements of ASTM Specification D 98, and shall not exceed two (2) percent by weight of the cement in the mixture.

2.11 FLY ASH

- A. Fly ash shall be considered for approval as a substitute for not more than twenty (20) percent of the cement in the concrete mixture.
- B. Fly ash shall conform to the requirements of ASTM Specification C 311.

2.12 CONCRETE ADHESIVE AND/OR STRUCTURAL GROUT

- A. An epoxy-resin system shall be used when a strong and/or watertight bond is required between new and old concrete.

B. The epoxy material shall consist of a 2-component system conforming to the following requirements:

1. Component A - The A component shall have a weight per epoxide of 160 - 175 and be 100 percent reactive.
2. Component B - The B component shall be primarily a reaction produce of one (1) mole of an aliphatic polyamine and two (2) moles of mono functional epoxide containing compounds modified with 2, 4, 6, tri (dimethylaminomethyl) phenol.
3. The component ratio of B to A shall be 1:1 1/2 by volume.
4. Properties of mixed components shall conform to the following requirements:

| | |
|-------------------------------|------------------------|
| Solids Content | 100% by weight |
| Pot Life | 40-50 minutes @ 75 F |
| Contact Time & Tack-Free Time | 4 hours minimum @ 75 F |
| Initial Viscosity | 1,800-2,000 cps @ 75 F |
5. Properties of cured material shall conform to the following requirements.

NEAT BINDER

| | |
|--------------------------------|---|
| Tensile Strength ASTM D-638 | 3,200 psi minimum @ 14 days, 75 F cure |
|--------------------------------|---|

| | |
|---|----------------------------|
| Tensile Elongation ASTM D-638 (modified) | 1% minimum @ 14 days, 75 F |
|---|----------------------------|

| | |
|------------------------------------|------------------------------------|
| Compressive Strength ASTM-D-695 | 12,000 psi minimum @ 14 days, 75 F |
|------------------------------------|------------------------------------|

| | |
|-----------------------------------|-------------------------------------|
| Compressive Modulus ASTM D-695 | 400,000 psi minimum @ 28 days, 75 F |
|-----------------------------------|-------------------------------------|

| | |
|--|---|
| Flexural Strength ASTM C-78 Modified Hardened concrete to hardened concrete | 95% of area of break must be in concrete |
|--|---|

| | |
|--|---|
| Plastic concrete to hardened concrete (glue line in verticle position) | 75% of area of break must be in concrete |
|--|---|

| | |
|---|----------------------|
| Water Absorption 14 days 75 F Cure 24 hours immersion | 1% by weight maximum |
|---|----------------------|

| | |
|--|--|
| Bond Strength of Epoxy Plastic hardened concrete "slant cylinder test" | 3,500 psi minimum @ 28 days, 75 F of area of break must be in concrete angle of glue line 60 from horizontal |
| Deflection Temperature ASTM D-1525 (modified) | 150 F, minimum |

Mortar: One (1) part Binder to three-and-quarter parts Aggregate by loose volume.
Compressive Strength 12,000 psi minimum @ 28 days, 75
ASTM C-109 F
(modified)
(2" cubes)

6. Aggregate shall be as recommended by resin manufacturer

7. Chemical Acceptance:
SPI Classification - 2 - (A Component)

The cured system shall have the acceptance of the U.S. Dept of Agriculture for use in food processing plants.

When tested following the procedure prescribed in the Environmental Control Administration of the Public Health Service, the cured system shall be in conformity with the Federal Regulation requiring water extractables of less than 0.5 mg per square inch of exposed surface for potable water containers.

8. The Contractor shall furnish upon request of the Engineer or Owner, notarized certification that the material proposed for use meets all of the above requirements.

2.13 ANCHOR SYSTEM

A. Reinforcing bars and/or non-expansive anchors shall be installed by using the HILTI HVA adhesive anchor system in strict accordance with the manufacturer's specifications.

2.14 GROUT

A. An expansive grout shall be used in all areas where a grout or leveling course is required by construction.

- B. The grout shall be composed of selected silica sands, modified cements, possalanic, plasticizing, and water-reducing admixtures.
- C. The grout shall be entirely non-metallic and shall be suitable for both interior and exterior applications.
- D. The grout shall be a one-step product delivered to the job site in bags containing a pre-mixed formulation requiring only the addition of water prior to use.
- E. The physical properties of the grout shall meet the following requirements:
 - 1. Initial Set (ASTM-C-191) 45 min.
 - 2. Final Set (ASTM-C-191) 180 min.
 - 3. Compressive Strength (ASTM-C-109)
 - 24 hours 5,000 psi (352 kg/sq.cm)
 - 3 days 6,000 psi (422 kg/sq.cm)
 - 7 days 8,000 psi (562 kg/sq.cm)
 - 28 days 10,000 psi (703 kg/sq.cm)
 - 4. Volume Change (ASTM -C- 827)
 - 24 hours + 0.032%
 - 3 days + 0.033%
 - 7 days + 0.035%
 - 28 days + 0.035%
 - 5. Tensile Strength
 - 24 hours 400 psi (28 kg/sq.cm)
 - 3 days 460 psi (32 kg/sq.cm)
 - 7 days 550 psi (39 kg/sq.cm)
 - 28 days 600 psi (42 kg/sq.cm)
- F. The following grout manufacturers' products or equal products shall be considered for approval:
 - 1. SONOGROUT as manufactured by Sonneborn-Contech, Minneapolis, Minnesota.
 - 2. FIVE STAR GROUT as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut.
- G. Grout shall be stored, handled, mixed, and placed as recommended by manufacturer for use intended.

CONCRETE

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 TEMPERATURE

- A. If concrete is to be placed when the atmospheric temperature is expected to be less than 40 F, methods as outlined in ACI 306 shall be strictly followed.
- B. If concrete is to be placed when the atmospheric temperature is expected to exceed 90 F, methods as outlined in ACI 605 shall be strictly followed.

3.2 PREPARATION OF SUBGRADE

- A. Subgrade shall be free of sawdust, debris, water, ice, snow, extraneous oil, mortar, or any other substances that may be deleterious to the concrete.
- B. Rock surfaces shall be cleaned by air-water cutting, wet sand blasting, or wire brush scrubbing, as necessary and shall be wetted immediately prior to placement of concrete.
- C. Earth surfaces shall be firm and damp.
- D. Class A concrete shall not be placed on mud, dried earth, uncompacted fill, or frozen subgrade.
- E. Mud mats of Class B concrete shall be permitted upon written approval of the Engineer.
- F. When Class A concrete is to be placed on highly pervious materials which might allow flowing groundwater to damage fresh concrete, the contact surface shall be covered with a layer of asphalt-impregnated building paper or polyvinyl sheeting prior to placement of the concrete.

3.3 FORMS

- A. All formwork shall be done in accordance with recommended practices contained in ACI 347.
- B. Forms shall be of wood, plywood, steel, or other approved materials and shall be mortar-tight.

- C. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the dimensions and contours as shown on the drawings.
- D. Form surfaces shall be smooth and free from holes, dents, sags, or other irregularities.
- E. Forms shall be coated with a non-staining oil before being set in place.
- F. Metal ties or anchorages within the forms shall be equipped with cones, she-bolts, or other devices that permit their removal to a depth of at least on (1) inch without injury to the concrete.
- G. Remove forms in a manner and at such time to insure complete safety of the structure. In no case shall supporting forms or shoring be removed until sufficient strength has been obtained to support weight and load.

3.4 PLACING

- A. All concrete shall be placed in accordance with ACI 304.
- B. All construction debris and extraneous matter shall be removed from within the forms.
- C. Struts, stays, bracing, and blocks, serving temporarily to hold the forms in correct shape and alignment, shall be removed.
- D. All concrete shall be placed on clean, damp surfaces, free from water, or upon properly consolidated fills.
- E. Concrete shall be deposited in approximately horizontal layers, not to exceed eighteen (18) inches.
- F. Concrete shall be consolidated by means of mechanical vibrating. Vibrators shall be inserted and removed vertically at regular intervals to insure uniform consolidation. In no case shall vibrators be used to transport concrete inside the forms. Internal vibrators shall maintain a speed of not less than 7,000 impulses per minute when in operation. At least one (1) standby vibrator shall be on hand at all times during placing.

3.5 FINISHING

- A. All concrete surfaces shall be true and even and shall be free from open or rough spaces, depressions, or projection.

- B. All exposed surfaces of the concrete shall be accurately screeded to grade and then floated prior to final finishing. Excessive floating or troweling while the concrete is soft will not be permitted. The addition of dry cement or water to the surface or screeded concrete to expedite finishing will not be allowed.
- C. After removal of forms, all bulges, fins, form marks, or other irregularities that may adversely affect the appearance or function of the concrete shall be removed.
- D. All cavities left by form ties or any other device shall be cleaned and patched by non-shrinking mortar.
- E. Concrete shall be finished in accordance with the following schedule unless specifically excepted:

| Surface | Finish |
|--|-----------------------------------|
| All exposed verticle surfaces from six (6) inches below grade or minimum operating level | Smooth rubbed finish |
| Floor slabs of tanks and channel floors | Smooth floated finish |
| Interior building floors | Steel trowel finish |
| Leveling grout for tank slabs and channel floors | Screeded with steel trowel finish |
| Exterior horizontal traveled surfaces | Light broom finish |
| Exterior ramp or sloped traveled surfaces | Stiff broom finish |
| Exposed exterior horizontal surfaces except as listed above | Smooth rubbed finish |

3.6 CURED

- A. All concrete shall be prevented from drying for a period of seven (7) days after it is placed.
- B. Curing may be accomplished by any of the approved methods as listed in ACI 68-25.

3.7

GROUTING

- A. Foundations for base plates or machinery bases shall be brought to an elevation such that there is one (1) inch clearance for each sixteen (16) inches horizontally the grout must flow.
- B. All areas to be grouted shall be clean and free of oil, grease, dirt, and contaminants. All loose material shall be removed. Where required, air relief openings shall be provided to avoid entrapment of air. All metal components to be in contact shall be de-rusted and free of paint or oils. All concrete to come into contact with the grout shall be rough finished and shall be thoroughly saturated by dampening or soaking prior to placement of grout. Remove excess water from holes and voids.
- C. For column base plates and machinery bases, standard forming procedures shall be followed that allow proper and complete placement of the fluid grout, including the use of head forms. Support elements to be anchored so that no movement is possible. Remove support only after grout has hardened sufficiently. Wood surfaces that can absorb moisture shall be pre-treated with forming oils. Edges of concrete to be grouted which are less than one (1) inch thick shall be cut back to form a uniform butt.
- D. Grout shall be placed in accordance with standard grouting procedures and recommendations of ACI for placing and curing of concrete. Use chains, rods, or tamping devices to compact grout tightly, completely removing all air voids. Place grout quickly and continuously, striking off exposed areas. Finished grout shall be cured with standard methods.
- E. Grout shall be protected from temperatures as recommended by manufacturer.
- F. Grout formulation as recommended by manufacturer shall be used for services intended.

CAST-IN-PLACE CONCRETE PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Cast-in-place concrete will not be measured.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for cast-in-place concrete. The cost of this work is to be included by the Contractor in the total cost of the contract.

SPEC. 10 GEOTEXTILE FABRIC CONSTRUCTION

GEOTEXTILE FABRIC CONSTRUCTION PART I - GENERAL INFORMATION

1.1 DESCRIPTION

- A. Geotextile fabric Construction shall consist of storage and handling, protection from sunlight, excavation, grading, preparation of the surface to receive the fabric, placement of the fabric, joining, overlapping, pinning, and all other incidentals needed to complete the work. Geotextile Fabric Construction shall be in accordance with this specification and in close conformance with the lines, grades, elevations, and materials shown on the drawings or further specified in the notes on the Drawings.

1.2 QUALITY ASSURANCE

- A. The Contractor shall provide samples of the Geotextile Fabric to the Engineer and Owner before construction. Deliver sample and manufacture's specifications for installation to Owner and Engineer.

GEOTEXTILE FABRIC CONSTRUCTION PART 2 - PRODUCTS

2.1 MATERIALS

- A. Geotextile Fabric shall consist of strong, rot resistant, chemically stable long-chain synthetic polymer material dimensionally stable with distinct and measurable openings. The plastic or yarn fibers used in the geotextile shall consist of any long-chain synthetic polymer composed of at least 85 percent by weight of polyefins, polyesters, or polyamides, and shall contain stabilizers and inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The geotextile shall be calendered or otherwise finished so that the yarns or fibers will retain their relative position with respect to each other.
- B. For further information on the type and/or manufacturer's name of the geotextile fabric to be used on this project, see the Drawings or the Special Requirements.
- C. Geotextile fabric shall meet the requirements specified in Section 913.18 (Geotextile for Use Under Riprap) of the Indiana Department of Transporation Standard Specification current addition.

GEOTEXTILE FABRIC CONSTRUCTION

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 GEOTEXTILE STORAGE, PROTECTION AND HANDLING

- A. Storage and handling of the geotextiles shall be in accordance with the manufacturer's recommendations, except that in no case shall the geotextile be exposed to direct sunlight, ultraviolet rays, water, temperature greater than 140 degrees F, mud, dirt, dust, and debris, to the extent that its strength, toughness or permeability are diminished. Each geotextile roll shall be labeled or tagged to provide product identification sufficient for inventory and quality control and quality assurance purposes. Exposure of geotextile fabrics to the elements between laydown and cover shall be a minimum of 14 days. At the time of installation, the geotextile shall be rejected and replaced with no additional payment if defects, rips, flaws, deterioration, or damage incurred during manufacture, transportation, storage or installation (construction) is evident.

3.2 GEOTEXTILE CONSTRUCTION

- A. The surface to receive the geotextile fabric shall be prepared to a smooth condition free of obstruction, depressions and debris. The surface shall be excavated, graded and prepared to the lines, grades, and elevations shown on the Drawings and/ or Construction Standards.
- B. Geotextiles used along channels shall be placed with the machine direction of the geotextile parallel to the channel. Successive geotextile sheets shall be overlapped in such a manner that the upstream sheet is placed over the downstream sheet and the upslope sheet over the downslope sheet.
- C. Geotextiles used for two to one slopes or greater shall be place with the machine direction of the geotextile sheets perpendicular to the toe of slope. The geotextile sheets shall be overlapped in the direction of the anticipated movement of the water.
- D. Adjacent pieces of geotextile may be joined by sewing or by overlapping and pinning. The minimum overlap shall be 18 inches except when placed under water. When placed under water the overlap shall be a minimum of 3 feet. Securing pins shall be steel, 3/16 of an inch in diameter, 18 inches long, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of no less than 1.5 inches. Securing pins with washers shall be inserted through both strips of overlapped geotextile at spacing intervals as indicated in Table 1 below. Securing pins shall be along a line through the midpoint of the overlap. The geotextile strip shall be placed

so that the lower strip will be overlapped by the next higher strip. Pins shall be driven until the washer bears against the geotextiles and secures it firmly to the ground.

TABLE I
SECURING PINS SPACING INTERVALS
FOR GEOTEXTILE FABRIC OVERLAP

| Slope (Horizontal:Vertical) | Pin Spacing per Row (Center:Center) |
|--------------------------------|--|
| steeper than 3:1 | 2 ft. |
| 3:1 to 4:1 | 3 ft. |
| 4:1 or flatter | 5 ft. |

Whether the fabric is joined by sewing or pinning, additional pins shall be installed as necessary to prevent any slippage of the fabric regardless of location.

- E. The geotextile shall be placed in such a manner that placement of the overlaying materials will not excessively stretch or tear the geotextile and will not pull the required overlap or seam apart. Construction equipment will not be allowed on the exposed geotextile.
- F. Placement of the riprap or stone shall start from the base of the slope, moving upslope from the center outward. Riprap shall not be allowed to roll downslope and the height drop for riprap shall be kept to less than one foot.

GEOTEXTILE FABRIC CONSTRUCTION PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Geotextile fabric shall be measured on a square yard basis in place. No measurement will be made of the overlap areas. No measurement will be made of sewing, pins, and other appurtenances necessary for construction.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for geotextile fabric. The cost of this work is to be included in the total cost of the contract.

- B. Payment for geotextile fabric will include storage, handling, protection from sunlight, excavation (unless there is a separate pay item for excavation), grading (unless there is a separate pay item for grading), preparation of the surface to receive the fabric, placement, overlapping, sewing, or pinning and all other items necessary to complete construction. If it becomes necessary for the contractor to replace geotextile fabric because of failure to meet the conditions of this geotextile fabric construction specification, no additional payment will be made.

SPEC. 11 GABIONS

GABIONS

PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. Gabions are heavy duty rectangular baskets made of heavily galvanized steel wire mesh of triple twist hexagonal weave having a mesh opening of 3.25 inches by 4.5 inches. Each gabion is subdivided into cells of equal size by diaphragms.
- B. Gabion construction shall include the excavation grading, supply, delivery, assembly, placement, fill material (riprap or stone ... see plans), filling, led closing, adjustment, and all other items needed to complete the work. Gabion construction shall be in accordance with this specification and in close conformance to the lines, grades, elevations, size, thickness, typical cross sections, cross sections, and materials shown on the Drawings (plans) and construction Standards.
- C. Gabion construction shall be in conformance to manufacturer's instruction for assembly and erection. At the construction site they are unfolded and assembled by lacing the edges together and the diaphragms to the sides. Gabion units are laced together and filled with stone from 4 to 8 inches in diameter. The lids are then closed and wired to the top edges of the gabions.

1.2 QUALITY ASSURANCE

- A. The Contractor shall supply the name of the supplier and copies of Gabion manufacturer's material specifications to the Owner and the Engineer. Contractor shall keep copies of the manufacturer's "Instructions for Assembly and Erection" at the job site for use by the Contractor and review by the Owner and Engineer.

GABIONS

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wire Specifications. All steel wire used in the gabions shall be heavily galvanized with a zinc coating exceeding Federal Specifications QQ-W-461g, class 3 which call for a minimum weight of 0.80 oz. per sq. foot. The hot dipped galvanizing shall be done before the weaving of the gabion wire.

- B. Galvanized Gabions. The mesh steel wire diameter for the galvanized gabions shall not be less than 0.1181 inch (U.S. gauge no. 11).
The mesh edge wire and selvedge wire shall not be less than 0.1535 inch (U.S. gauge no. 9).
The lacing wire for binding the gabion units together shall not be less than 0.0866 inch (U.S. gauge no. 13.5).
- C. PVC Coated Gabions. The mesh steel wire diameter for the PVC coated gabions shall not be less than 0.1063 inch (U.S. gauge no. 12).
The mesh edge wire and selvedge wire shall not be less than 0.1338 inch (U.S. gauge no. 10).
The lacing wire for binding shall not be less than 0.0866 inch (U.S. gauge no. 13.5).
PVC coating shall be 0.4mm (0.015 inch) for PVC bonded to the wire, the weight of the zinc coating shall be 0.10 oz. per sq. foot.
- D. Stone fill for gabions shall be no less than 4 inches in average diameter and no greater than 8 inches in average diameter. Stone fill shall be either native stone or limestone riprap. Native stone shall be of the same general size and density as limestone riprap. Limestone riprap shall be in general conformance to Indiana Department of Transportation Standard Specifications current edition for Revetment Riprap unless Stone fill type, size, and shape are specified otherwise on the plans, bid proposal, or construction standards.

GABIONS

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 SUPPLY AND DELIVERY

- A. Gabions shall be supplied folded flat, tied in pairs and packed in bundles. Gabions shall be identified by color coding and/ or labels that indicate their size and dimensions.

3.2 GABION ASSEMBLY

- A. Gabion assembly shall be in accordance with the manufacturer's "Instruction for Assembly and Erection" and in general shall be as follows:
 - 1. Remove a single gabion from the bundle and proceed to unfold it on a hard, flat surface. Stretch the gabion and stamp out all kinks.
 - 2. Fold the front and back panels to a right angle by stepping on the base along the crease. Fold up the end panels and diaphragms and fasten them to the front and back panels using the heavy gauge wire projecting from the upper corners

of each panel. This procedure shall assure properly squared baskets with the tops of all panels even.

3. Securely lace all vertical edges of ends and diaphragms of the gabion basket. Use galvanized lacing wire as supplied by gabion manufacturer. No substitution of common wire will be permitted. The lacing procedure is as follows:
 - a. Cut a length of lacing wire approximately one and one-half (1.5) times the distance to be laced but not exceeding 5 feet.
 - b. Secure the wire terminal at the corner by looping and twisting, then proceed lacing with single and double loops at approximately five (5) inch intervals.
 - c. Securely fasten the other lacing wire terminal.

3.3 GABION INSTALLATION

- A. Before placing the gabion, the Contractor shall make the ground surface relatively smooth, even, and free of obstructions. The base for the gabions shall be stable.
- B. The assembled gabions shall be carried to the installation site and placed in their proper location. It is convenient to place the gabions front to front and back to back in order to facilitate and expedite the stone filling and lid lacing operation.
- C. For structural integrity, the adjacent gabions must be laced along the perimeter of all contact surfaces. To facilitate this operation it may be easier for the Contractor to construct sub-assembly in the yard or a staging area consisting of as many gabions as can be handled at one time. The sub-assembly is then placed at the job site and laced along the perimeter of all contact surfaces.
- D. The base of the empty gabion placed on top of a completed row must also be tightly wired to adjoining baskets.
- E. The following method applied to three (3) foot high gabions:
 1. Gabions should be placed empty and laced for the complete stretch of baskets (up to approximately 100 linear feet). The first gabion shall be firmly anchored and tension shall be applied to the other end with a come-a-long or other means, in order to achieve the proper alignment. Anchoring can be accomplished by partially filling the first gabion with stone.
- F. While gabions are being stretched inspect all corners for open "V's" which will result if corners were not properly secured. Such "V's" must be closed by relacing.

- G. Keep gabions in tension while being filled. Leave the last gabion empty to allow for easily lacing the subsequent sub-assembly.

3.4 GABION FILLING

- A. The fill material shall consist of hard, durable, clean stone (4 to 8 inches in diameter in size) or as specified otherwise on the plans, bid proposal, or construction standards.
- B. Gabions shall be filled in three lifts, one foot at a time. Two connecting wires are placed between each lift in each cell of all exposed faces. This operation is repeated until gabions are filled.
- C. To protect the vertical panels from being bent during the filling operation, rebars may be temporarily placed and laced along the upper edges. Another method is to bend a length of pliable metal and place it over the vertical panels.
- D. Gabions may be filled by almost any type of earth-handling equipment; payloader, gradall, crane, conveyor, or backhoe. Some manual stone adjustment during the filling operation is required to prevent undue voids.
- E. The exposed face(s) should be hand-placed using selected stone. This hand-placing will add to the appearance of the structure by preventing the gabions from bulging. The last lift of stone should be level with the top of the gabion to properly close the lid and provide an even surface for the next course.

3.5 GABION LID CLOSING

- A. Fold the lid down along the hinge line so that the lid and gabion edges meet closely without gaps. To assist in closing and lacing the lids, a pinch bar closer may be used.
- B. Secure the lid at the corners with the wire projecting from the lid. Lace the lid shut, starting with the front face and then the ends and diaphragms. A tight joint must be achieved during the lacing operation, adjacent lids may be wired to the vertical panels in one operation.

3.6 OTHER GABION CONSTRUCTION

- A. Gabions may be readily cut or bent to form regular shapes to fit the dimensions shown on the plans or to fit bridge piers, culverts, etc. Part of the mesh may also be cut to allow installation of pipe and other. Where this is done, the cut or bent edges of the mesh shall not be left loose but shall be fastened securely to another part of the structure.

GABIONS

PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Gabions shall be measured on a square yard basis in place based upon the required height (or thickness) of the gabion. No measurement will be made of the stone fill or other items necessary for a complete construction unless listed as a separate pay item.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for gabions. The cost of this work is to be included in the total cost of the contract.
- B. Payment for gabions will include excavation, grading, supply, delivery, assembly, placement, fill material, filling, securing, lacing, lid closing, adjustment and all other items needed to complete the work. No extra or separate payment will be made for the stone (or riprap) fill material.

SPEC. 12 RIPRAP

RIPRAP

PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall include materials and installation of riprap in accordance with these specifications and in conformance with the Drawings (plans), cross sections, typical cross sections, and construction standards, unless otherwise directed by the engineer.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. Comply with requirements of a governmental agencies having jurisdiction.

RIPRAP

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Limestone or gravel riprap material shall comply with all applicable paragraphs of Section 904.02 Coarse Aggregates of the Indiana Department of Transportation Standard Specifications current edition.
- B. Dumped Riprap. Dumped riprap shall consist of broken concrete, masonry, or stone removed from an old structure; broken pieces removed from an old structure; broken pieces removed from concrete pavement, base, or monolithic brick pavement; broken rock from class X, class Y, unclassified excavation, or solid rock excavation; or it may be material similar in nature produced from sources outside the right-of-way. The material shall be broken into pieces which can be handled conveniently.

- C. Revetment Riprap. The gradation of the material shall be such that:
1. No individual piece weighs more than 120 pounds,
 2. 90 to 100 percent of the material passes a 12 inch sieve,
 3. 20 to 60 percent of the material passes a 6 inch sieve, and
 4. Not more than 10 percent of the material passes a 1 1/2 inch sieve.

Reasonable care shall be taken in loading to obtain a similar gradation for consecutive loads.

- D. Hand Laid Riprap. Hand laid riprap aggregate shall consist of pieces, except spalls, no less than 1/3 of a cubic foot in volume and 3 inches in the least dimension. The width of these pieces shall be no less than 6 inches for 6 inch hand laid riprap, nor less than 12 inches for 12 inch hand laid riprap. When material removed from an old structure or other removed masonry item is to be used as hand laid riprap, any of these requirements which are inconsistent with the character of the material may be waived.
- E. Grouted Riprap. Grouted riprap aggregate shall be in accordance with the requirements for hand laid riprap.

The mortar shall be composed of one part portland cement to 4 parts No. 23 fine aggregate. The cement and fine aggregate may be dry-mixed in an approved mixer or by hand in a watertight box until the color of the mixture becomes uniform. Water shall be added as the mixing continues until the grout attains a consistency which will allow it to flow into the joints.

RIPRAP

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 CONSTRUCTION REQUIREMENTS

- A. Placing Dumped Riprap. Dumped riprap shall be placed at locations shown on the plans or as directed. It shall be placed to produce a surface of approximate regularity but need not necessarily be hand placed. The finished surface shall vary no more than 9 inches from a true plane. The thickness perpendicular to its surface shall be no more than 2 feet nor less than one foot unless otherwise directed. Overhaul will not be paid. Hauling the material more than 2000 feet from its origin will not be required if obtained from on the right-of-way.
- B. Placing Revetment Riprap. Revetment riprap may be placed by dumping and shall be placed to the required thickness at the locations shown on the plans or as directed.

- C. Placing Hand Laid Riprap. The thickness of hand laid riprap shall be no less than that specified, measured perpendicular to the slope. For 6 inch hand laid riprap this thickness shall be no less than 6 inches, and for 12 inch no less than 12 inches.

Unless otherwise directed, the slope upon which this riprap is to be placed shall be in accordance with the cross section shown on the plans. Laying shall begin in a trench below the toe of the slope. It shall progress upward with each piece being laid by hand perpendicular to the slope. It shall be firmly embedded against the slope and the adjoining piece with the sides in contact and with well broken joints. The spaces between the larger pieces shall be filled with spalls of suitable size which shall be thoroughly rammed into place. The finished surface shall present an even tight surface true to line, grade, and section. Broken concrete pavement used for 6 inch hand laid riprap shall be placed with the smooth side up.

- D. Placing Grouted Riprap. The aggregate, preparation of the slope, and method of placing the riprap aggregate for grouted riprap shall be in accordance with construction requirements for placing hand laid riprap. After the aggregate has been placed and accepted, all interstices shall be completely filled with the cement grout. The finished surface shall be smooth, solid, and true to line, grade, and section.

RIPRAP

PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Dumped riprap, revetment riprap, hand laid riprap and grouted riprap will be measured in square yards of the specified depth parallel to slope.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for riprap. The cost of this work is to be included by the Contractor in the total cost of the contract.

SPEC. 13 SHEET PILING

SHEET PILING

PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This work shall include materials and installation of sheet piling in accordance with these specifications and in conformance with the Drawings (plans), cross sections, typical cross sections, and construction standards, unless otherwise directed by the engineer.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity and numbers to accomplish the work of this Section in a timely manner.
- C. Comply with requirement of all governmental agencies having jurisdiction.

SHEET PILING

PART 2 - PRODUCTS

2.1 SHEET PILING MATERIAL

- A. Sheet piling used in weir construction shall be C-Loc Corrugated C-L 4500 as manufactured by:

C-Loc Retention Systems, Inc.
P.O. Box 180283
Utica, MI 48318-0283
(801) 731-9511

- B. Sheet piling shall be manufactured with the following physical characteristics:

- 1. Material - P.V.C.

2. Finish width - 12" per sheet.
3. Thickness - 0.225 in.
4. Depth - 4.5 in.
5. Section Modulus 4.2 cubic inches per foot.
6. Color - clay.

SHEET PILING

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 SHEET PILING INSTALLATION

- A. Sheet piling installation shall be in accordance with the manufacturer's "C-LOC Technical Bulletin CL - 4500".

SHEET PILING

PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Sheet piling will be measured on a square foot basis for the size, type, and gauge indicated on the plans or construction standards. Measurement will be made of the sheet piling in place only.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for sheet piling. The cost of this work is to be included in the total cost of the contract.

SPEC. 14 LANDSCAPING

LANDSCAPING PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. Landscaping shall include plantings, landscape materials, equipment, labor, fertilizer, and watering as indicated on the plans, as specified and as needed for a complete and proper landscape installation.

1.2 QUALITY ASSURANCE

- A. It is the intent of this landscaping specification to require complete, live, and growing landscape plantings at the completion of this project and prior to final payment of landscaping items. Landscape materials shall be purchased from suppliers who have grown these materials in the same climate and temperature zones as the Owner's project. Landscaping items shall be replaced by the Contractor as many times as necessary to meet the intent of this specification.
- B. Contractor shall use adequate skilled workmen who are thoroughly trained and experienced in landscape construction in order to ensure a complete and proper landscaping installation.
- C. Standards:
 - 1. Plants and planting materials shall meet or exceed the specifications of Federal, State, and County laws requiring inspection for plant disease and insect control.
 - 2. The quality and size of the planting materials shall comply with the current edition of "Horticultural Standards" for number one nursery stock as adopted by the American Association of Nurserymen.
 - 3. All plants shall be true to name with one or more of each bundle or lot tagged with the name and size of the plants in accordance with the standards of practice of the American Association of Nurserymen. Botanical names take precedence over common names.

1.3 SUBMITTALS

- A. Product data: Within thirty (30) calendar days after the Contractor has received the Notice to Proceed, the Contractor shall submit:
 - 1. Complete list of landscaping materials.

2. Data on the source, size, and quality of landscaping materials.
 3. Suppliers certifications and other certificates to prove place of origin of the landscape items and to verify other requirements of this landscaping specification.
 4. Other certificates required by law to accompany landscaping shipments.
- B. The Contractor shall immediately remove from the project site those landscaping materials which are not true to name and those materials that do not comply with the specified landscaping requirements. Removed landscaping materials are to be promptly replaced with materials that meet or exceeded this landscaping specification.

LANDSCAPING

PART 2 - PRODUCTS

2.1 FERTILIZER

- A. Provide complete fertilizer containing percentages of plant food as determined by analysis. Fertilizer shall be an N-K-P mixture (nitrogen phosphorous, and potassium) with a ratio of 2-1-1. Fertilizer shall be uniform in composition, dry, and free flowing. Any fertilizer which becomes caked or otherwise damaged shall not be used.
- B. Fertilizer shall be delivered to the project site in bags labeled with the manufacturer's guaranteed analysis.

2.2 TOPSOIL

- A. Topsoil shall be light friable loam containing 3 to 5 percent organic matter by test, free from heavy clay, stones (over one-half inch), plants, roots, sticks, or other foreign materials. Topsoil for grass areas shall be replaced with topsoil stripped from project site. If additional topsoil is required in order to provide a two (2) to three (3) inch layer of topsoil for grass areas, the Contractor shall supply additional topsoil from outside the project site. Samples of additional topsoil shall be supplied by the Contractor for approval prior to placement on the project site.

2.3 MULCH

- A. Provide medium-coarse shredded hardwood and bark. Mulch shall be free from large chunks of wood, leaves, and twigs.

- B. Specific types of wood mulch for certain areas of the project may be indicated on the plans or drawing details. Contractor shall provide the type of wood mulch specified for those areas.

2.4 TREE STAKES

- A. Unless otherwise indicated on the drawing, the Contractor shall provide 1.5 inch by 2.75 inch by 8 ft. long tree stakes made of yellow pine. (This size of stake determined by ripping a nominal 2 X 6 board). Tree stakes shall be free of large knots that would make them easily breakable. Hardwood stakes are also permissible. Tree stakes shall not be softwoods such as fir, spruce, or most pines.

2.5 STRAW MULCH

- A. Provide clean, new shredded winter wheat straw free of weeds, thistle, debris, disease, and molds.

2.6 EROSION CONTROL MATERIAL

- A. Erosion control material shall be one of the following types:
 1. Excelsior Blanket as made by the American Excelsior Company.
 2. Heavy Jute mesh as manufactured for erosion control purposes. (The use of burlap bag material is not permitted).

2.7 PLANT MATERIALS

- A. Contractor shall provide all plant materials as shown on the Drawings or listed separately on the Bid proposal, construction standards, and details.

2.8 OTHER MATERIALS

- A. Contractor shall supply all other material not specifically described but required for a complete landscaping installation.

LANDSCAPING PART 3 - EXECUTION

3.1 STRIPPING OF TOPSOIL

- A. All topsoil in landscaping areas shall be stripped and stockpiled on the project site for replacement at the appropriate time.

- B. Stockpiled topsoil shall be stored in such a manner that prevents erosion or siltation of nearby ditches, streams, or bodies of water. If necessary, the Contractor shall water the stockpiled topsoil in order to prevent wind erosion.

3.2 PREPARATION OF LANDSCAPING SITES

- A. Rough Grading
Prepare the soil subsurface to within two (2) to three (3) inches of finish grade including sloping for proper drainage. Remove stones, sticks, roots, brush, and any other debris larger than one (1) inch in diameter. If necessary, compact the soil to required subsurface specification. Do not overcompact planting areas. If subsoil has been overcompacted due to heavy equipment or other construction causes, Contractor shall discard overcompacted areas.
- B. Topsoil Replacement
Contractor shall replace topsoil at all landscaping sites to finish grades and elevations unless other surface grade landscaping materials are specified or indicated on the Drawings. In grass areas topsoil replacement shall be two (2) to three (3) inches. In flowerbeds and other landscaping areas, topsoil replacement shall be six (6) to eight (8) inches.
- C. Fine Grading
The soil surface shall be leveled and graded to a smooth and even surface. All stones, sticks, roots, brush, and any other debris larger than one (1) inch in diameter shall be removed from the landscaping area. Any tire ruts, disc markings, undulations, or other irregularities in the smoothness of the grading shall be leveled. Low areas shall be filled and graded level with surrounding areas.

3.3 PLANTING TREES AND SHRUBS

- A. General
Plant nursery stock immediately upon delivery to the site if that is possible. All bare root and balled landscaping materials are to be covered with damp soil to protect from the wind and sun. Landscaping materials on the site are to be regularly watered and placed in cool areas protected from the sun and drying winds.
- B. Plant Delivery
Contractor shall promptly notify the Engineer and Owner when landscaping materials are delivered to the site and an itemized list shall be provided at time of delivery. The itemized list for each delivery shall include all necessary information so that the landscaped materials can be identified and counted. Contractor shall exercise care

care in handling balled plants in order to prevent disturbing or damaging the root systems. Balled plants shall not be dropped from the truck to the ground.

C. Timing of Planting

The Contractor shall not start planting landscaping materials until other work has progressed to the point that landscaping materials will not be disturbed. Rough grading, placement of topsoil, and fine grading shall be done before planting of landscape materials. Planting operations shall be performed under favorable weather conditions during seasons that are normal for planting. Seeding and planting in flood prone areas must be timed to avoid normal flooding months.

D. Layout of Landscaping Materials

Landscaping plantings shall be located as indicated on the Drawings except where obstructions are encountered overhead or below ground or where changes have been made in the construction of the project. Planting locations not approved by the Engineer are subject to relocation by the Contractor. Prior to excavation of planting areas or plant pits or placing tree stakes, the Contractor shall determine the location of all utility lines, electric cables, and other underground conduits or pipe. The Contractor shall promptly notify the Engineer so that alternate design locations can be determined by the Engineer for landscaping plantings.

E. Excavation

1. For shrubs in one gallon containers, dig a hole twelve (12) inches in diameter and twelve (12) inches deep.
2. For shrubs and trees in five (5) gallon containers, dig a hole twenty (20) inches in diameter and twenty (20) inches deep.
3. For trees in fifteen (15) gallon containers, dig a hole thirty (30) inches in diameter and thirty (30) inches deep.
4. For large tree balls, dig a hole twenty-four (24) inches in diameter larger than the ball.

F. Planting of Trees and Shrubs

Set plants at the proper grade and alignment and in a vertical position. Set plants so that, when settled, they will be at the same plant depth that they were before being transplanted. Once the plant is set, backfill with a backfill mixture containing three (3) parts topsoil and one (1) part soil amendment (if a soil amendment is specified or shown on the drawings). Do not use frozen backfill material or topsoil in a muddy condition. Contractor shall backfill in such a manner to prevent air pockets from forming. Thoroughly water each plant when the hole is two-thirds backfilled. After watering, tamp the soil in place until the surface of the backfill is level with the surrounding area. Build up a temporary watering basin around the base of the plant by forming a soil ring.

G. **Mulching**

Apply the specified mulch to a depth of three (3) inches evenly spread over the entire area of the soil basin. If no specific type of mulch is indicated on the drawings or specified, Contractor shall use hardwood shredded wood bark mulch.

3.4 **PLANTING FLOWERS AND GROUND COVER**

- A. Rough grading, placement of soil, and fine grading shall be completed before the planting of flowers and ground cover.
- B. Flowers and ground cover are to be located and spaced evenly as indicated on the Drawings.
- C. Planting beds shall be prepared by tilling the soil to a minimum of eight (8) inch depth. Planting bed lines shall be smooth and continuous. Tilled areas should be raised with topsoil and soil amendment so that the planting beds are higher than the surrounding areas and well drained.
- D. All plants shall be thoroughly watered immediately after planting. After watering, the soil shall be raked and the specified mulch shall be applied to a depth of two (2) inches. If no specific type of mulch is indicated on the Drawings or specified, Contractor shall use hardwood shredded wood bark mulch.

3.5 **PRUNING AND REPAIR**

- A. Following planting, all trees and shrubs shall be pruned and injuries repaired. Pruning shall be limited to removal of dead or injured twigs and branches and to the amount of pruning to compensate for the loss of roots from transplanting.

3.6 **WRAPPING**

- A. Wrapping of trees shall be done immediately after planting. Trunks of all trees are to be spirally wrapped from bottom to top and tied securely at a minimum of two (2) foot intervals and at bottom and top of wrapping. Overlap the wrapping about two (2) inches. Entirely cover the trunk from the ground to the height of the second branches. Wrap neat and snug. Inspect trees for injury to trunks, evidence of insects, and improper pruning before wrapping.

3.7 **STAKING**

- A. All trees are to be staked as shown on the Drawings or construction standards. For trees less than four (4) inch caliper, use one stake. For trees four (4) inch caliper or

larger, use two (2) stakes. For each stake use two (2) tree ties. Stakes are to be driven twenty-four (24) to thirty (30) inches into the ground.

3.8 INSPECTION

- A. In addition to normal progress observations, the Contractor shall schedule and conduct the following formal landscaping inspections, giving the Engineer at least twenty-four (24) hours notice:
 - 1. Inspection of plants in containers prior to planting.
 - 2. Inspection of plant layout to verify compliance with the Drawings.
 - 3. Final inspection after completion of planting. This inspection is to be scheduled in advance so that the inspection may be conducted within twenty-four (24) to forty-eight (48) hours of the completion of planting.
 - 4. Maintenance inspection shall be conducted after deficiencies have been corrected. This final maintenance inspection will be made after the end of the maintenance period.

3.9 MAINTENANCE OF LANDSCAPING PLANTINGS

- A. Contractor shall maintain all landscaping plantings for a period of sixty (60) calendar days after planting is complete and approved for payment by the Engineer.
- B. Work included:
Maintenance of landscaping materials includes:
 - 1. Watering, weeding, cultivating, spraying, and necessary pruning to keep the plant materials in a healthy growing condition and to keep the planted areas neat and attractive throughout the maintenance period.
 - 2. Providing equipment and means to water those landscaping planting areas not equipped with an irrigation system.
 - 3. Protecting planted areas and materials from damage.
- C. Replacements:
 - 1. At the end of the maintenance period, all landscape plantings shall be in a healthy growing condition.
 - 2. The Contractor shall replace any landscape planting not in a healthy growing condition.
 - 3. Replacement required because of vandalism or other causes beyond control of the Contractor are not a part of this Contract.
- D. Guarantee:
 - 1. The Contractor shall provide a written guarantee for a period of one (1) year from the date of acceptance at final inspection. All plantings shall be

guaranteed to be in a healthy growing condition. Landscape planting items rejected shall be replaced at no additional cost to the Owner.

2. During the guarantee period the Contractor shall inspect the plantings periodically to determine if any replacements are necessary.
3. Any delay in the completion of any landscaping planting items which extends the planting into more than one planting season shall also extend the guarantee period.

3.10 SUBSTITUTIONS OF PLANT MATERIALS

- A. Substitutions will be permitted only upon written request by Contractor that the original specified plant materials are not available.
- B. The Contractor shall provide the nearest equivalent variety, size, and quality of landscaping plantings.
- C. Substitutions must be approved in advance by the Engineer or the Contractor will be required to replace substituted materials without payment.

LANDSCAPING PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. All trees, shrubs, flowers, and other individual units of landscaping plantings will be measured on a per inch basis. Fertilizer, topsoil, watering, tree stakes, straw mulch, wrapping, and replacements will not be measured. Erosion control fabric will be measured on per square foot basis. Mulch will be measured on per square foot basis.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for landscaping items. The cost of this work is to be included in the total cost of the contract.
- B. Payment for trees, shrubs, flowers, and other landscaping plantings shall include the fertilizer, topsoil, watering, tree stakes, wrapping, replacements, excavation, grading, and all other items necessary to provide complete, healthy, properly watered, growing landscaping plantings.

SPEC. 15 SEEDING AND SODDING

SEEDING AND SODDING PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. Work included: provide either or both plain and mulch seeding, broadcast seeding, or placing approved sod. It includes furnishing and placing seed, fertilizer, agricultural limestone, topsoil, and mulch in a prepared seedbed; or furnishing and placing sod at location shown on the plans. Seeding and sodding also includes all necessary watering.

1.2 QUALITY ASSURANCE

- A. It is the intent of this Seeding and Sodding Specification to require the Contractor to water the seeded and sodded areas as many times as necessary to insure a good, growing finished product at the completion of the project.
- B. The watering of the seed and sod shall continue until germination has been achieved and a satisfactory growth of new grass and/or maintained growth of the sod is achieved.

SEEDING AND SODDING PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials shall conform to the following requirement as specified in the following subsections of the Indiana Department of Transportation Standard Specifications current edition.

| | |
|------------------------------|------------|
| Agricultural Limestone | 914.02 |
| Fertilizers | 914.03 |
| Grass Seed | 914.04 |
| Water | 914.09 (a) |
| Leguminous Inoculants | 914.06 |
| Mulch | 914.05 (a) |
| Sod | 914.07 |

2.2 SEED MIXTURE

- A. The seed mixture for this project shall be applied at a rate of 130 pounds per acre. The mixture shall consist of ten (10) pounds of Annual Ryegrass, thirty (30) pounds of certified fine leaf Perennial Ryegrass, thirty (30) pounds of Creeping Red Fescue, thirty (30) pounds of certified common Kentucky Bluegrass, or Newport Kentucky Bluegrass, or Park Kentucky Bluegrass, and thirty (30) pounds of Wabash Kentucky Bluegrass or equal.

2.3 SEED MIXTURE (BALL DIAMOND MIX)

- A. The seed mixture (ball diamond mix) for this project shall be applied at a rate of 7 pounds per 1000 square feet . The mixture shall consist of: eighty (80) percent turf type Tall Fescue, ten (10) percent Kentucky Bluegrass, and ten (10) percent Buffalo Grass.

SEEDING AND SODDING

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 PREPARATION OF GROUND BEFORE SEEDING

- A. The area to be seeded shall be made smooth and uniform and shall conform with the finished grade and cross section shown on the plans. It shall have been given final trimming. No soil to be seeded shall be tilled when in a wet or muddy condition.
- B. The seedbed, if not loose, shall be loosened to a minimum depth of three (3) inches before fertilizer and seed is applied. Where soil is highly subject to erosion and to receive jute mesh, one (1) inch depth of tillage is required.

3.2 FERTILIZING, SEEDING, AND MULCHING

- A. Fertilizer shall be applied and spread uniformly over the area to be seeded and sodded at a rate of 800 pounds per acre. Agricultural limestone shall be applied at a rate of 1,000 pounds per acre over all areas to receive seeding or sod. Fertilizer and limestone shall be mixed into the top two (2) inches of the soil prior to seeding or sodding.
- B. Seed may be drilled in or mixed with water and the mixture sprayed over the area to be seeded. An approved mechanical method to place the seed in direct contact with the soil may be used.

- C. Seeded areas shall be thoroughly mulched by a method approved by the Engineer. Mulching material shall be applied uniformly in a continuous blanket at a rate of two (2) tons per acre, except wood cellulose fiber mulch shall be applied at a rate of 1,500 pounds per acre. The percent of moisture in the mulch shall be determined in accordance with the Indiana Department of Transportation Standard Specifications Section 621.12 (c) current edition.
- D. Mulching material shall be punched into the soil so that it is partially covered. The punching operation shall be performed longitudinally with a mulch tiller. The tool used for punching purposes shall be discs that are notched and have a minimum diameter of sixteen (16) inches. The discs shall be flat or uncupped such as notched coulters commonly used on moldboard plows. Discs shall be placed a maximum of eight (8) inches apart along the axle or shaft. Shaft or axle sections of discs shall not exceed eight (8) feet in length.
- E. The mulch tiller for punching shall be constructed so that weight may be added or hydraulic force from the tractor may push the puncher into the ground. If heavy weights are not used, several trips over the area may be necessary to work part of the mulch into the soil. Care shall be exercised to obtain a reasonable even distribution of mulch incorporated into the soil.
- F. On slopes steeper than 3 to 1, or when specified, the following methods will be permitted for mulching:
 - Method 1: The mulch may be held in place by spraying with a satisfactory liquid asphalt or asphalt emulsion.
 - Method 2: Hydroseeding.
- G. After procedures for holding the mulch in place have been completed, mulch (other than when applied by hydroseeder) shall be watered thoroughly. The seed or soil beneath it shall not be displaced. The mulching material shall be maintained in place satisfactorily until final completion and acceptance of the project.
- H. When seeding is performed between June 1 and August 15, a second thorough watering shall be applied approximately twenty (20) days after the seeding. Watering shall be done in such a manner as to not displace the seed, sod, or soil underneath it. Contractor shall continue to water as needed and as required by weather conditions.

3.3

PREPARATION OF GROUND BEFORE SODDING

- A. The area to be sodded shall be made smooth, uniform, and shall conform to the required cross section. Surfaces prepared for sod shall be of sufficient depth below unsodded areas that newly laid sod will conform to the surrounding surface. That is, sod shall not be laid "on top of the ground", but a bed shall be prepared for laying the sod so it will be contained by the surrounding soil.
- B. Prior to placement of sod, the stockpiled topsoil shall be placed, scarified, or disced slightly. A disc, spike-toothed harrow or other similar device shall be used for this purpose. This loosening is to assure bond of the topsoil with the surface on which it is put and to form a uniform surface. Topsoil shall be spread to a uniform depth of six (6) inches and compacted lightly with an approved roller, tamping device, or by other methods.
- C. After the area has been prepared (including the topsoil) agricultural limestone shall be applied at the specified rate of 500 pounds per acre, and fertilizer shall be applied at the rate of 400 pounds per acre. The surface soil shall be loosened to a depth of two (2) inches and then raked before the sod is place. All clods, lumps, boulders, or waste materials shall be removed prior to placement of the sod.

3.4

LAYING SOD

- A. Sod strips shall be laid carefully by hand. Sod shall be fitted to the grade and sod strips shall be butted together closely to avoid open joints. After laying and initial watering, the sod shall be tamped or rolled as directed by the Engineer to insure contact with the soil underneath and to conform with the surrounding surface. After compaction, the sod shall present a smooth, even surface, free from lumps and depressions.
- B. Sod placed on slopes greater than 3 to 1 shall be pegged. The pegs shall be spaced not over two (2) feet apart, and each strip measured lengthwise of the strip. Pegs shall be driven down until no more than one (1) inch protrudes above the surface of the sod.
- C. Pegs shall be wood, at least 1/2-inch by 3/4-inch by 12-inch. No pins shall be allowed in lieu of the wooden pegs.

3.5

WATERING SOD

- A. Sod shall be watered thoroughly, immediately after placing and kept moist for at least seven (7) days. The Contractor will be required to repair or replace any sod which is not in good growing condition at the completion of the project.

3.6 SEASONAL LIMITATIONS

- A. Seeding will be permitted only from February 1 to November 15. Seeding without mulch shall not be done between May 1 and August 15. During other periods, the time of sowing shall be determined by the Engineer, whose decisions will be based upon soil moisture and weather conditions.
- B. No sod shall be laid during the months of June, July, and August unless written permission is obtained from the Engineer. When such permission is granted, the Contractor shall, before laying sod out of season, agree in writing to the following provisions:
 - 1. Sod shall be in good, living, growing condition.
 - 2. Sod shall be placed within 36 hours after cutting and protected from damage during that period.
 - 3. Sod shall be watered sufficiently and otherwise maintained so that it will be in a live, growing condition at the time of final acceptance of the project, provided that the period between placing sod and acceptance is greater than thirty (30) days.
- C. Winter sodding will be permitted when the temperature is above 35 degrees F. No frozen sod shall be laid nor shall sod be laid on frozen soil. Sod shall be properly protected from drying out and shall be laid within 48 hours after cutting.

3.7 LIMITS OF SEEDING AND SODDING

- A. The limits of seeding shall be all those areas on the project site that are disturbed due to construction. The areas to be seeded shall be done only after approval by the Engineer, and any disturbed areas outside these limits shall be required at the Contractor's expense.

SEEDING AND SODDING

PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Seeding will be measured by the square yard. Seeding and mulch will be measured by the square yard. Sodding will be measured by the square yard. No measurement will be made of fertilizer, limestone, and inoculants. If measurements are made of poundage of seed, fertilizer, and limestone it will be in order to check the application rates of these items.

4.2

BASIS OF PAYMENT

- A. There will be no separate payment for seeding and sodding. The cost of this work is to be included by the Contractor in the total cost of the contract.
- B. No separate payment will be made for fertilizer, limestone, inoculants, and water.
- C. It is the intent of this specification to require the Contractor to provide to the Owner good, live, growing grass, and sod areas at the completion of the project. The Contractor shall reseed and/or resod all areas so designated by the Owner's representative at no additional expense to the Owner. The Contractor shall provide all necessary watering to meet this intent.

SPEC. 16 PENETREATED LUMBER

PENETREATED LUMBER

PART 1 - GENERAL INFORMATION

1.1 DESCRIPTION

- A. This specification is intended to cover the general requirements of the penetreated wood to be used on this project. Penetreated lumber (wood) shall mean lumber which is preservative treated by pressure processes in accordance with American Wood Preservers Association (AWPA) standards.

1.2 QUALITY ASSURANCE

- A. The Contractor shall provide samples of the penetreated lumber to the Owner and the Engineer. The samples shall be delivered to the project site or to an agreed upon site (if the Contractor has not started construction). The samples shall consist of lumber purchased from the supplier selected by the Contractor for this project. The samples shall include typical boards and posts of the size, length and type that will be used for this project.
- B. The Contractor shall supply certification(s) from the supplier indicating the type of pressure treated preservative used for the penetreated lumber and the AWPA standard pressure process that was used. All penetreated lumber shall be marked with the appropriate American Wood Preservers Bureau (AWPB) Quality Control Mark.

PENETREATED UMBER

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Penetreated lumber shall be pressure applied preservative treated lumber. The wood preservative treatment shall be clean, odorless, safe to handle, non-leachable, easily painted or stained, lumber with a preservative treatment that protects from decay and termites.
- B. The Preservative treatment shall be applied by the penetreated lumber manufacturer with a pressure process that impregnates and penetrates throughout the entire piece of wood.

- C. All penetreated lumber shall be pressure treated with an Environmental Protection Agency registered pesticide containing chromated copper arsenate (CCA). Penetreated lumber shall be as manufactured by Hoover Treated Wood Products (penetreated lumber product called "Dixie CCA") or equal.
- D. All penetreated lumber shall meet the requirements of the following specifying agencies:
1. Federal Specification TT-W-550 (latest revision)
 2. Federal Specification TT-W-571 (latest revision)
 3. American Wood Preservers Association (AWPA) Standards P5, C1, C2, C3, C4, C5, C9, C14, C16, C18, C23
 4. American Wood Preservers Bureau (AWPB) Standards LP-2.LP-22, FDN, MLP
 5. American Association of State Highway Officials (AASHO)
 6. Federal Housing Administration (FHA)
- E. All pressure treated lumber shall be southern pine ("Dixie CAA" or equal), pressure impregnated in accordance with the recommended practices of the AWPA. All penetreated lumber shall carry the AWPB LP Quality Control mark indicating compliance with the appropriate AWPB Quality Control Standard.
1. For above ground use
All penetreated lumber shall be treated to a net retention of 0.25 lbs. per cubic foot of wood and each piece shall bear the American Wood Preservers Bureau (AWPB) Quality Mark, LP-2 "Above Ground Use".
 2. For ground contact use
For use in contact with ground, all penetreated lumber shall be treated to a minimum net retention of 0.40 lbs. per cubic foot of wood and each piece shall bear the AWPB Quality Mark, LP-22 "Ground Contact Use".
 3. For use in contact with water pr permanent wood foundation systems
All penetreated lumber shall be pressure treated to a minimum net retention of 0.60 lbs. per cubic foot of wood and shall bear the AWPB Quality Control Mark, "FDN" for use in permanent wood foundations.
- F. Nails, screws, bolts, connectors, fasteners and other accessories (all related hardware) shall be hot-dipped zinc-coated or otherwise rustproofed.

PENETREATED LUMBER
PART 3 - CONSTRUCTION REQUIREMENTS

3.1 STANDARDS

- A. All penetreated lumber construction shall be performed by the contractor according to accepted basic carpentry industry standards. In the event that there is a disagreement between the Contractor and the Owner or Engineer about the quality of the penetreated lumber construction techniques, disagreements will be settled by referring to the booklet entitled "Basic Carpentry Illustrated" by Sunset. (This booklet is typically available at Furrows or other lumber yards or suppliers.)

3.2 CONSTRUCTION TECHNIQUES.

- A. All penetreated lumber construction shall be in close conformance to the lines, grades, lengths, details as indicated on the plans and construction standards. In addition, the contractor shall follow the following construction techniques:
 - 1. Reduce and eliminate splitting by pre-drilling a pilot hole for all fasteners. The diameter of the pilot hole shall be $\frac{3}{4}$ of the diameter of the fastener.
 - 2. Place no fasteners closer to the edge of a board than $\frac{3}{4}$ inch.
 - 3. Place no fasteners closer to the end of a board than one and one-half inch.
 - 4. Bevel all top sides of posts and other upright structural members in order to facilitate drainage and minimize moisture absorption. (30 degree bevel unless indicated otherwise on plans).
 - 5. Use galvanized or otherwise rustproofed deck screws instead of nails (unless otherwise indicated on plans, see construction standards, construction details or notes on drawings).

PENETREATED LUMBER
PART 4 - PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Measurement of penetreated lumber construction will be made on a per structure basis. No measurement will be made of individual posts, boards, fasteners, connectors, and other appurtenances.

4.2 BASIS OF PAYMENT

- A. There will be no separate payment for penetreated lumber. The cost of this work is to be included in the total cost of the contract.

APPENDIX A

DEPARTMENT OF THE ARMY PERMIT

Permittee: Lake Manitou Association, Incorporated

Permit Number: 199500073

Issuing Office: U.S. Army Engineer District, Louisville

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: To improve the water quality in Lake Manitou in accordance with the attached plans.

Project Location: On Graham Ditch on the east side of Lake Manitou in Fulton County, Indiana

Permit Conditions:

General Conditions:

1. The time limit for completing the authorized activity ends on May 31, 1998. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification from this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of your permit.

Approved
502-582-5607

Special Conditions:

- a. That straw bale barriers, silt fencing, and/or other approved methods of erosion control be implemented throughout construction.
- b. That all construction equipment be refueled, repaired and any required routine service be done at an upland site away from Graham Ditch and any existing wetland areas.
- c. That a wetland monitoring report be submitted once per year for a period of 3 years documenting the wetland vegetation, hydrology, rate of vegetative growth, and any measures to further enhance the wetland development. The reports must be submitted by November 30 of each year after construction completion.

☒ d. That the construction of Structure Number 1 and Baffles 5 and 6 are prohibited.

Further Information:

1. Congressional Authorities. You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
 - a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measure ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give you favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Robert W. Weaver
(PERMITTEE) President Lake Monitor Assoc, Inc

May 22, 1995
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

RALPH GRIECO
COLONEL, CORPS OF ENGINEERS

(COMMANDER AND DISTRICT ENGINEER)

6-1-95
(DATE)

BY: Ms. Lee Anne Devine
Project Manager
Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL OF CONSTRUCTION IN A FLOODWAY

ICANT:

e Manitou Association, Inc.
. Box 376
hester IN 46975

AGENT:

J.F. New & Associates, Inc.
David P. Whittlesey
708 Roosevelt Road
Walkerton IN 46574

AM:

ham Ditch
ke Manitou Inlet)

AUTHORITY:

IC 13-2-22, 310 IAC 6-1, 6-2
IC 13-2-11.1, IC 13-2-15

ECT DESCRIPTION:

pplicant proposes to enhance the water quality of Lake Manitou by constructing 2 sheet piling weir structures, 6 earthen
es, and 2 sediment traps. It is proposed to maintain the wetland pool elevations at 782.0 and 784.0 feet, N.G.V.D.,
ctively, at the downstream and upstream structures. Details of the project are shown on plans received at the Division of
on January 17, 1995.

ECT LOCATION:

ownstream weir structure will be located approximately 1,000' and 2,800' east of the Bessmore Park Road bridge and the
eam sediment trap will be about 4,500' east of the bridge,
ar Rochester, Rochester Township, Fulton County
ection 14, T. 30N, R. 3E, Rochester Quadrangle
oordinates: Downstream = 4554350 North, 570250 East, Upstream = 4544450 North, 571300 East

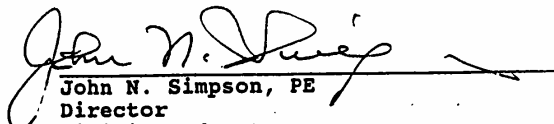
ORIZATION AND APPEAL NOTICE:

signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the
itions as stated on the pages entitled "General Conditions" and "Specific Conditions". This permit or any of the conditions
it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders
rocedures Act, IC 4-21.5, and by the Department's rules relating to adjudicative proceedings, 310 IAC 0.6. In order to
in an appeal, a written petition must be filed within 18 days of the mailing of this notice. It should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

petition should contain specific reasons for the appeal and indicate the portion(s) of the permit to which the appeal pertains.
an appeal is filed, the Natural Resources Commission will make the final agency determination following a legal proceeding
acted before an Administrative Law Judge.

h 16, 1995


John N. Simpson, PE
Director
Division of Water

nts prepared by: Jimmy Yee & Scott McClarney

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

- (1) This permit must be posted and maintained at the site of the permitted activity until the project is complete.
- (2) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 4 et seq.; 36 CFR 800.11, et al) and state law (IC 14-3-3.4) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within two (2) business days.
- (3) This permit should not be construed as a waiver of any local ordinance or other state or federal laws.
- (4) This permit does not relieve the permittee of the responsibility of obtaining additional permits, approvals, easements, etc. as required by other federal, state, and local agencies. These agencies include, but are not limited to:

U.S. Army Corps of Engineers, Louisville District
Indiana Department of Environmental Management
Fulton County Drainage Board
Local city or county planning and zoning commission

- (5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of life and property of others.
- (6) This permit may be revoked by the Department for violation by the applicant of any condition, or applicable statute or rule.
- (7) This permit shall not be assignable or transferable without the prior, written consent of the Department.
- (8) The Department shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.
- (9) The receipt and acceptance of this permit by the applicant shall be considered as acceptance of all "General" and "Specific" conditions contained therein.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIFIC CONDITIONS

- 1) other than those measures necessary to satisfy the "General" and "Specific" conditions, there shall be no deviation from the information received at the Division of Water on the following date(s) without the prior written approval of the Department of Natural Resources:

Information received: January 17, 1995

- 2) this approval shall become void if construction has not been initiated within 24 months from March 16, 1995
- 3) seed and mulch all disturbed areas not protected by other methods
- 4) maintain functional erosion and sediment control measures until all disturbed areas are stabilized
- 5) control erosion and sediment on land adjacent to the floodway to prevent resulting sedimentation of the channel or floodway
- 6) seed and protect all 3:1 or steeper slopes with erosion control blankets when they are not protected by other structural methods
- 7) minimize and contain within the project limits all tree and brush clearing and provide the opportunity to utilize cleared trees of firewood and timber size
- 8) revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes upon completion
- 9) clean sediment traps whenever they reach 50% of their capacity
- 10) do not leave felled trees, brush, or other debris in the floodway



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live

Evan Bayh
Governor
Kathy Prosser
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
Telephone 317-232-8603
Environmental Helpline 1-800-451-6027

March 24, 1995

VIA CERTIFIED MAIL Z 339 822 518

Colonel Ralph Grieco
U.S. Army Corps of Engineers, Louisville District
P.O. Box 59
Louisville, Kentucky 40201-0059

Attention: Ms. Lee Anne Devine, CEORL-OR-FN

Dear Colonel Grieco:

Re: Section 401 Water Quality Certification
Lake Manitou Association, Inc.
J.F. New and Associates, Inc.
Public Notice 199500073
Fulton County

Office of Water Management staff have reviewed Public Notice 199500073, dated February 17, 1995, regarding the construction of silt traps, earthen dams, and baffles to disperse the flow of Graham Ditch upstream of Lake Manitou to allow for sediment deposition. A total of 4.69 acres of jurisdictional wetland will be impacted by this project.

Based on the available information, it is the judgment of this office that the proposed project will not cause a significant impact to water quality provided that conditions set forth by the State are incorporated into the project. Therefore, subject to the following conditions, the Office of Water Management hereby grants Section 401 Water Quality Certification:

1. Physical disturbance of soils and existing vegetation, especially woody stems and native aquatic species, will be limited to that which is absolutely necessary to achieve the purpose of the project.
2. The contractor performing the actual operations must comply with Section 311 of the Federal Clean Water Act and with 327 IAC 2-6 (formerly Indiana Stream Pollution Control Board Regulation 330 IAC 1-6-1) concerning spills of oil and hazardous materials.

3. Deposition of dredged or excavated materials and all earthwork operations will be carried out in such a manner that soil erosion and sediment runoff to any nearby watercourse are controlled and minimized. The use of straw bale barriers, silt fencing, or an earthen berm around disturbed areas is recommended to prevent soil from leaving the construction site. Areas used for deposition of dredged materials should be provided with temporary dikes or bulkheads for separation and retention of solids. Vegetative cover should be established on dredged or excavated material as soon as possible.
4. All erosion control structures and devices will be regularly monitored and maintained, especially after precipitation events, until all soils disturbed by construction activities have been permanently stabilized.

Granting of Section 401 Water Quality Certification does not relieve the applicant from the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

1. You must petition for review in a writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.

2. You must file the petition for review with the Technical Secretary of the Water Pollution Control Board at the following address:

Technical Secretary
Water Pollution Control Board
100 North Senate Avenue
P.O. Box 6167
Indianapolis, Indiana 46206-6167

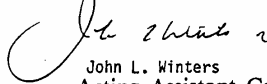
3. You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day IDEM offices are closed during regular business hours, you may file the petition the next day IDEM offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to the Technical Secretary, the date that the envelope containing the petition is postmarked if it is delivered by the United States mail, or the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, a person may obtain notice of any prehearing conferences, preliminary hearings, hearings, stays, and orders disposing of the proceedings without intervening in the proceedings by

providing the Technical Secretary with a written request that: (1) describes the subject of the notice with reasonable particularity; and (2) is delivered to the Technical Secretary at the above address within seven (7) days of receipt of the notice.

If you have any questions regarding this decision, please contact Heidi Kuehne of my staff at 317/243-5149.

Sincerely,

A handwritten signature in dark ink, appearing to read "John L. Winters", with a large, stylized initial "J" and a trailing flourish.

John L. Winters
Acting Assistant Commissioner
Office of Water Management

cc: Lake Manitou Association, Inc. VIA CERTIFIED MAIL
J.F. New & Associates, Inc. VIA CERTIFIED MAIL
David Hudak, USFWS
Louise Clemency, USEPA
Mike Neyer, IDNR
Steve Jose, IDNR